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OPEN-AIR HOSPITALS.

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The war has given us an opportunity of applying the principles and practices of open-air treatment, which have proved so advantageous in tuberculous and other morbid states, to the needs of sick and wounded soldiers.

The three chief advantages claimed for temporary open-air hospitals based on the general plan of the First Eastern General Hospital at Cambridge are—(1) Cheapness of construction, (2) Rapidity of erection, and (3) Success in treatment. These points merit brief consideration. I will deal with them in special reference to our experience in Cambridge.[1]

1. *Cheapness in Construction.*—It is difficult, in a way, to compare the cost per bed of the Cambridge Hospital with that of the more permanent hospitals in large towns. The cost, indeed, is not constant, for whereas that of the first 500 beds worked out at somewhere about £20 per bed, by the time the hospital had been increased to 1,450 beds this cost had fallen to just below £17 per bed. This is explained by the fact that the expense of the fencing of the grounds, the offices, the operating theatre, the recreation-room, etc.—

[1] For a detailed account of the open-air hospital for troops at Cambridge see "The Open-Air Treatment of the Wounded (the First Eastern General Hospital, Cambridge)," by A. E. Shipley, Sc.D., F.R.S. With a chapter by W. J. R. Simpson, C.M.G., M.D., F.R.C.S. Published by the *Country Life* Publishing Department, 20, Tavistock Street, W.C. Price 1s. net. We are indebted to the kindness of Dr. Shipley and the courtesy of the Editor of *Country Life* for the loan of the blocks from which the accompanying illustrations have been prepared.—Ed. *B.J.T.*

INTERIOR OF AN OPEN-AIR WARD OF THE FIRST EASTERN GENERAL HOSPITAL AT CAMBRIDGE.

though some of them had to be slightly enlarged—were now spread over a much larger number of beds. In estimating this low cost we must recall that there was no expense incurred in buying a site. The Government simply commandeered the King's and Clare cricket-ground; and as the site chosen was a cricket-ground, no costly levelling was needed, and, as the building was of the lightest, the foundations required were almost negligible. Also, the absence of special wards for women and children diminished the expenditure. Again, in a town hospital provision is made for putting up the nursing staff, but at Cambridge the nurses are housed in the adjacent colleges of King's and Selwyn, and this again lowered the cost per bed at the open-air hospital. Finally, of course, the hospital is temporary; how temporary we do not know, but it is already nearly thirteen months since the first patients were received, and yet the older part of the hospital is still sound and in good repair. From the hygienic point of view there is something to be said for temporary hospitals. Some authorities hold that it would be well if hospitals could be rebuilt every few years, and on new sites, but this is obviously impossible with our big urban institutions.

Another economy is that the whole building is on the ground-floor, and absolutely on the same level throughout. When on the wooden floor of the ward one is on the same level as that of all the passages, all the store-rooms and offices, the operating theatre, the kitchens, etc., so that no time or energy is wasted in carrying things up and down stairs.

2. *Rapidity of Construction.*—The buildings of our Cambridge open-air hospital consist of a wooden framework, the walls being covered externally with asbestos slabs, and resting on brick foundations with a bitumen damp-course, generally of the same construction as the asbestos hut of the German Kaiser which was so much talked about at the earlier period of the war. The asbestos slabs are comparatively thin, but are impervious to weather, their one disadvantage being that they are apt to be broken by a really hard blow; but it is said that the material hardens as it ages. The roof is of wooden boarding covered with "Ruberoid," a bituminous weatherproof sheeting of considerable durability which also is largely fire-resisting. The walls are only enclosed on three sides—the east, west, and north; and even on the north side an opening, protected by "louvres," is left close to the roof to insure a free circulation of air throughout. On the south side the wards are entirely open to sun and air, except for a low open railing at the floor level and ordinary sun-blinds, such as are used over shop fronts, hanging from the ceiling level. Thus the "sweet airs, more joy-giving than morning's, but as cool as midnight's breath," are not "pocketed," but really sweep over the beds and the patients. In fact,

INTERIOR OF AN OPEN-AIR WARD OF THE FIRST EASTERN GENERAL HOSPITAL AT CAMBRIDGE.

GENERAL VIEW OF AN OPEN-AIR WARD OF THE FIRST EASTERN GENERAL HOSPITAL AT CAMBRIDGE.

the plan adopted is, as the Spanish comedian says, "to bind the air with nets."

The Government first sanctioned a hospital for 500 beds, and this, with all the attendant offices and central buildings, was completed within a month. Subsequently the size was doubled, and later again increased by some 300 beds, and each addition, with its drainage, lighting, etc., was erected in a correspondingly short time. For an emergency, when time is of the utmost importance, this rapidity of erection is of the greatest value.

Such a hospital, with its light walls in a framework of wood which "gives," all on the ground-floor, is eminently adapted for an "earthquaky" country, and its construction has engaged the attention of both the Italian and the Japanese authorities. In fact, the hospital has been the subject of a long essay in the *Giornale d'Italia*, and my little pamphlet on "The Open-Air Treatment of the Wounded" is now being translated into Italian. One would certainly feel safer in such a building—whence, in case of a shock, all one has to do is to step into the open—than in a stone or brick hospital, however solidly built. Its cheapness, the rapidity with which it can be run up, and the facilities for just stepping outside should an earthquake occur, all recommend themselves to the authorities who are trying to replace the buildings destroyed by the seismic catastrophe in Italy this spring.

3. *The Success in Treatment.*—This is not altogether to be gauged by statistics and percentages. Comparisons on such a basis are not always quite fair, because necessarily the gravity of the cases admitted varies in different institutions, and is for the wounded, roughly, in inverse proportion to the distance from the field of action. Tables of statistics will be found in the monograph to which I have referred.

The percentage of deaths is now very slightly higher than during last winter, and this is especially the case amongst the sufferers from cerebro-spinal meningitis, the virulence of which varies markedly from time to time and from place to place.

There are other, and perhaps less, important features which are associated with the open-air treatment. Chief amongst them is the absence of pallor and mental depression so often noticed in the patients at large urban infirmaries. The men look healthy and seem in good spirits, and even lively. It is claimed that the rate of their recovery is "speeded up," and that the length of time necessary for their convalescence is shortened. The patients have more freedom to move about. They can circulate from ward to ward and exercise themselves in the ample grounds. There is more for them to watch and look at; flowers, birds, passers-by, even the clouds and the ever-shifting pageant of the sky, serve to distract their minds from their ailments. There is no

"hospital smell," no smell of cooking, no closeness of atmosphere. However many visitors crowd the wards, they cannot vitiate the air, and the feeling of "tiredness" and headache, which so often affect nurse, doctor, and patient alike, is unknown.

The success of the experiment is shown by the fact that the firm which built the Cambridge Hospital—Messrs. MacAlister and Skipper—is now erecting many others in all parts of Great Britain, and, as experience teaches, is introducing many improvements on the original design.

SUBCUTANEOUS TUBERCULIN INJECTIONS AND THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.

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The subcutaneous injection of "test" doses of tuberculin was generally recognized until comparatively recently as the most accurate means of determining the presence of active pulmonary tuberculosis in the so-called pre-bacillary stage. The work of Wasserman,[1] Hertwig,[2] Ehrlich,[3] and Wolff-Eisner,[4] effectually discredited any theories of the non-specific action of tuberculin, and the researches of Otten,[5] von Romberg,[6] Bandelier and Roepke,[7] have proved conclusively that a focal reaction occurring after injection indicates the existence of an active process. Any deficiencies the method might possess, such as discomfort or risk to the patient, or lack of general applicability, have been held, with some reason, to be more than counterbalanced by the value of an entirely negative or entirely positive result. With increased delicacy in the technique of serum examination, however, it has become more necessary to re-estimate the value of the tuberculin test in terms not of accuracy, but of applicability. It is of importance to know, for instance, in what percentage of cases the injections cannot be given, and in what percentage the course is discontinued before a sufficiently large dose is administered. With these points in view,

[1] Wasserman and Bruck: *Deut. Med. Woch.* 1906. No. 12.
[2] Hertwig: "Die Grundlage der Tuberculin-wirkung." 1891.
[3] Ehrlich: Int. Kong. für Hygien. 1903.
[4] Wolff-Eisner: "Die Fruhdiagnose." 1909.
[5] Otten: *Med. Klin.* 1910. No. 28.
[6] Von Romberg: Wiesb. Kong. für Inn. Med. 1910.
[7] Bandelier and Roepke: "Lehrbuch fr. Spez. Diag." 1913.

the writer has collected the results of 100 consecutive cases coming under his observation, in all of which diagnostic injections of tuberculin were given.

Technique.

The technique followed was that of Koch as modified by Bandelier and Roepke: The patient, provided his temperature were normal, was kept at rest and given four injections of albumose-free tuberculin—viz., 0·0002 c.c., 0·001 c.c., 0·005 c.c., 0·01 c.c.; a focal reaction was held to have occurred where moist râles were heard for the first time at any part of the lung, or where there was definite increase in previously heard râles, or where marked impairment of percussion note was made out over a previously normal area. Increases of cough or sputum, being relatively incommensurable, were not held to indicate a focal reaction; but the sputum, if any, after injections was examined by the sedimentation method of Ellerman and Erlandsen.[1] There was, however, one important alteration in the technique. Bandelier and Roepke consider that a febrile reaction of even 0·2° F. is an indication for repetition of the exciting dose, but, for reasons which will be given later, this was found to be impracticable, and, unless in cases with extensive signs, mild reactions to the earlier doses were ignored.

A summary of the actual results, without any reference to the maximum dose given, is as follows: Focal reaction, 16 per cent.; doubtful focal reaction, 5 per cent.; no focal reaction, 79 per cent.

Variation in Maximum Dose.

At first sight these results would seem to indicate a very high degree of efficiency, in that 95 per cent. of the cases gave either a positive or negative result; such a conclusion, however, is quite unjustifiable when one considers the variation in the maximum dose given in each case. In the following table the figures in brackets indicate the number of repetitions of the maximum dose given:

TABLE I.—INDICATING VARIATION IN MAXIMUM DOSES OF TUBERCULIN.

Dose of Tuberculin (in c.c. of A.F.).	0·01 (2)	0·01	0·005 (3)	0·005 (2)	0·005	0·001 (3)	0·001 (2)	0·001	0·0005 (2)
Focal reaction +	—	3	—	2	4	1	3	2	1
Focal reaction ±	—	—	—	1	3	—	1	—	—
Focal reaction −	4	49	4	7	10	—	4	1	—

[1] Ellerman and Erlandsen: *Zeitschr. für Hygien.* Band lxi., p. 219.

It will be observed that in the case of the doubtful or negative results—because, of course, the positive results are immaterial to the argument—only 53 out of 84 cases received a dose of 0·01 c.c. A.F., and the question immediately arises: Were the remainder (*i.e.*, 36·9 per cent.) sufficiently tested to justify a conclusive diagnosis? This question might be put in another way: What is the minimum dose necessary for diagnostic accuracy? The consensus of opinion seems to be that 0·01 c.c. is the necessary dose; Koch was of this opinion, and Wassermann, Bruck, Bandelier, Roepke and Waltershöfer[1] hold the same view, on the ground that frequently cases giving no reaction up to 0·005 c.c. give a definite focal reaction to 0·01 c.c. In sixteen of the writer's cases no reaction of any sort—local, general, or focal—was given to 0·005 c.c., but in two of these cases a definite focal reaction immediately followed the injection of 0·01 c.c.

The only extensive work on other lines is that of Löwenstein and Kaufmann,[2] who in certain cases give a cumulative series of injections—*i.e.*, 0·0002 c.c. are given four times in succession within ten or twelve days. This method is open to criticism from entirely opposite points of view, on the one hand, because of establishing a tuberculin tolerance, and, on the other, from the possibility of producing an anaphylactic state; it will be referred to later in the section dealing with the significance of general reactions. In the meantime it may be said that the method is generally considered to be unsatisfactory.

Significance of the General Reaction.

Granting, then, that 0·01 c.c. is the minimum dose for diagnostic accuracy, 36·9 per cent. of the negative or doubtful results were quite unsatisfactory, in that an increased dose might have produced a definite focal reaction. But, it might be argued, in spite of the absence of focal reactions, deductions as to the activity of the disease may be made either from the violence of the general constitutional reaction to the last dose given, or from the occurrence of such reactions to early (small) doses; indeed, Bandelier and Roepke do make a diagnosis on these lines in cases where 0·01 c.c. has not been given, taking into account also the history, symptomatology, and physical signs. The writer's experience leads him to the conclusion that such a course is not justifiable.

The next table shows the incidence of general reactions amongst fifty-three cases given a *full* course of injections with *negative* results:

[1] Waltershöfer: *Beiträge z. Klin. d. Tub.* Band xxi., Heft 2.
[2] Löwenstein and Kaufmann: *Zeitschr. für Tub.* Band xxi.

TABLE II.—INDICATING INCIDENCE OF GENERAL REACTIONS.

Dose of Tuberculin.	General Reaction.		Total.
	Mild.	Severe.	
0·0002 c.c.	12	3	15
0·005 ,,	19	2	21
0·001 ,,	27	10	37
0·01 ,,	28	16	44

It will be noted that a large percentage of negative cases reacted to the earlier doses, and the significance of this fact is increased when one remembers that in cases giving a *focal* reaction, the accompanying general reaction is, in 50 per cent., of a mild type. Further proof of the relative unimportance of general reactions is afforded by the fact that 60 per cent. of the cases which received a maximum dose of 0·005, and which were in addition entirely negative to serum methods, had severe general reactions to the earlier doses. Finally, in two carefully chosen cases, notwithstanding mild general reactions to 0·0002 c.c. and 0·001 c.c., and violent reactions to 0·005 c.c., the maximum dose (0·01 c.c.) was given, but with negative result.

It may be observed in passing that what is true of a progressive series of injections is all the more likely to be true of a cumulative series, such as is given by Löwenstein and Kaufmann, and that deductions of active disease from increased general reaction to each repetition of a small dose (0·0002 c.c.) are not likely to be accurate.

It might be held by those who, after the example of Pickert, Turban, Brown and others, are content with 0·005 c.c. or 0·0075 c.c. as a final dose, that a negative result to, say, 0·005 c.c. repeated twice or three times is sufficient evidence of inactivity, or that an increasing general reaction with each repetition is presumptive evidence of activity; but to do this is to ignore the fact that focal reactions may occur only to 0·01 c.c., and that a state of sensitiveness is easily established with large doses of tuberculin. Seven of these cases had 0·005 c.c. repeated two or three times with invariably increased general reactions, yet their serum reactions were negative. In any case such increasing reactions might be significant equally of recently healed disease as of active disease; and, finally, the general reaction admittedly does not localize the disease. In view of these facts it is necessary to revise the table of ultimate results, excluding from the negative cases those not fully tested. The new figures obtained are—

Focal reaction, 16 per cent. No focal reaction, 53 per cent.	69 per cent. definite results.
Doubtful reaction, 5 per cent. Incompletely tested, 26 per cent.	31 per cent. indefinite results.

Two further points are noteworthy—viz., the small proportion of focal reactions (16 per cent.) as compared with Hamman's 37 per cent.[1] and Möller's 36 per cent.; and the fact that, in spite of largely ignoring small general reactions—a procedure contrary to the accepted custom—the indefinite results numbered as many as 31 per cent. of all the cases tested.

Dangers of the Test.

The question of ignoring general reactions or of repeating the existing dose brings forward another important criticism of the tuberculin method—from the point of view of possible risk to the patient. This view is strongly advanced by Ulrici,[2] and although his statements as to the dangers of the focal reaction cannot be altogether accepted, chiefly because many of his bad results were noted from cases of known tuberculosis, his criticism cannot be wholly passed over. Against Ulrici's claims may be put the experience of Bandelier, Roepke, Penzoldt,[3] Otten, von Romberg, and Junker,[4] who state that, properly given, the test never causes any harm; at the same time, Bandelier and Roepke, of whom it is not unfair to say that they are enthusiastic protagonists of the method, report concerning two particular cases that, after no reaction whatsoever to 0·0002, 0·0[illegible] and 0·005 c.c., they gave typical reactions to 0·01 c.c., when tubercle bacilli were for the first time found in the sputum. Junker reports four cases where tubercle bacilli were found after testing; Otten observed three such cases; and Löwenstein noted this phenomenon in almost 5 per cent. of his tested cases. It is claimed that this is only a temporary condition, and that no ultimate harm is done, but such a claim cannot pass unchallenged.

It is generally agreed that one of the most definite signs of improvement in pulmonary tuberculosis is the disappearance of bacilli from the sputum; and whatever opinion one may hold concerning the stimulation of an active focus to the point of increasing the bacillary output as a matter of specific treatment, the question still arises: Is one justified under any circumstances in producing bacilli in the sputum for purposes of diagnosis?

It may be said, in reply, that this would not occur were proper precautions followed, mainly those that no febrile case should be tested,

[1] Hamman: *Int. Med. Arch* 1908.
[2] Ulrici: *Beiträge z. Klin. d. Tub.* 3 sup. Band.
[3] Penzoldt: Wiesb. Kong. für Inn. Med. 1910.
[4] Junker: *Beiträge z. Klin. d. Tub.* 1906. Band vi.

and that the slightest febrile reaction, even 0·2° F., should be an indication for repetition of the exciting dose; but in the writer's experience, if these precautions are carried out to the letter, a deadlock is reached in the majority of cases after, at any rate, the second dose (0·001 c.c.), owing to the occurrence of slight general reactions. As has been pointed out, the writer was compelled to modify the usual technique by ignoring slight reactions and continuing the series without repetition of exciting doses; even then the tests in 36·9 per cent. of negative cases were discontinued before the necessary minimum dose (0·01 c.c.) was given.

Now, whilst there is no great risk in ignoring slight reactions to early doses, as is shown by the fact that 88 per cent. of cases where such reactions were ignored the ultimate result was negative, it is by no means advisable to ignore severe reactions to any dose; and it is not likely, therefore, that this large percentage of incompletely tested cases will be reduced.

Contra-Indications.

A third important criticism of tuberculin diagnosis is that the recognized contra-indications rule out a considerable percentage of suspected cases. These contra-indications are four in number—viz., fever, hæmoptysis, cardiac disease, and renal disease.

In the writer's experience 10 per cent. of all doubtful cases could not be tested on account of a persistent low fever, and in many febrile cases which were ultimately tested the period of treatment which elapsed before the temperature became normal was frequently so prolonged (*e.g.*, six months) as to call in question a negative result.

And it must be remembered that such febrile cases are by no means necessarily suggestive of tuberculosis; in more than half of the writer's untested febrile cases the ultimate result, as indicated by serum reactions, was negative. On the other hand, recent hæmoptysis is not, in his opinion, an important contra-indication, although it is certainly an indication for careful dosage.

To these four must be added a fifth—namely, the existence of extensive impairment of the lung, no matter how suggestive of a clinically inactive process that impairment may be. In the writer's series of 100 cases, three only had bacilli in the sputum after testing; in two of these cases there was no warning general reaction to the previous doses, and in the third a general reaction had been ignored. In all three, however, the clinical signs suggested impairment of, at any rate, the greater part of one lobe, and in one case of two lobes.

It is not advisable, in the writer's view, to test any case where more than two-thirds of any one lobe are clinically impaired, and particularly where there is definite moisture to be heard on coughing.

Finally, in reviewing the utility of test-injections it must not be forgotten that a full test covers a period of at least eight days, during which time the patient must be at rest and under continual observation. Moreover, there is associated with, at any rate, the larger doses of tuberculin a very definite degree of discomfort; in thirty of these cases the patients complained of headache and malaise, whilst in twenty-nine others there was very marked discomfort, including headache, nausea, vomiting, pains in the limbs and at the site of injection, and occasionally rigors, the symptoms lasting for at least one or two days, sometimes for the greater part of a week. General ill-health for a few weeks after has occasionally been noted, but it is only fair to say that just as often a feeling of well-being has followed injections.

General Summary.

(1) A focal reaction set up by doses of subcutaneous tuberculin is definite proof of active pulmonary disease. (2) Where a dose of 0·01 c.c. has been given without producing a focal reaction, the case may be said to be negative. (3) No case is fully tested unless this dose has been given at least once. (4) In the large majority of cases slight general reactions are set up by small doses, which reactions can be, with proper precautions, ignored—indeed, *must* be ignored—if any more than a small minority are to reach the final dose. (5) In 36·9 per cent. of presumably negative cases, reactions which cannot be ignored are set up by the larger doses or by the repetition of these, with the consequent discontinuing of the test before the final dose is given; these cases are insufficiently tested. (6) Cases with moderately extensive signs should not be tested, and these, along with febrile suspects, form about 15 per cent. of all doubtful cases.

These conclusions would not of themselves afford any ground for criticizing the use of test tuberculin-injection, which until last year was the most delicate diagnostic method available; but they are of importance in view of the notable improvement in the technique of serum methods. The work of Radcliffe, Mackintosh, and Fildes[1] on complement fixation, and that of Radcliffe and de Wesselow[2] on the combined determination of the complement fixation, reaction, and estimation of the tuberculo-opsonic index, has shown that an accurate diagnosis can be made by such serum methods in at least 90 per cent. of suspected cases. These reactions, too, can be estimated without any contra-indications whatsoever, and the question arises whether, in sanatoria with convenient access to competent laboratory methods, this cumbersome method of testing by subcutaneous injections of tuberculin should not be altogether discarded.

[1] Radcliffe, Mackintosh and Fildes: *Lancet*, August 22, 1914.
[2] Radcliffe and de Wesselow: "Proc. Roy. Soc. Med." Vol. vii., p. 159.

DISPENSARY TREATMENT WITHOUT TUBERCULIN.

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THE functions of a tuberculosis dispensary are many and varied. Acting as it does as the pivot of the tuberculosis scheme in each district, its business largely consists in identifying and classifying the various types of tuberculous disease, and thereafter relegating each to its appropriate treatment in a sanatorium, hospital, or elsewhere. A diligent search for contacts, the supervision of home conditions, and the persistent dissemination of hygienic knowledge, are amongst its most obvious duties, and amidst the maze of clerical and administrative work which they involve, its powers and possibilities as a centre for treatment are sometimes apt to be lost sight of. It will, however, at once be said in regard to this that most dispensaries make a prominent feature of tuberculin administration, and in this way active and persistent treatment is constantly in force. Undoubtedly this is true, but the contention I wish to make here is that tuberculin administration is only a part, and, to my mind, but a small part, of the possibilities of a tuberculosis dispensary as regards treatment. Adoption of tuberculin therapy on a large scale by a dispensary is apt to convert a "tuberculosis" dispensary into a "tuberculin" dispensary—a very different thing.

The merits of tuberculin as a therapeutic agent are matters of acute controversy in the medical world, but there yet exists a considerable body of lay opinion which considers that no tuberculosis dispensary is doing its work properly unless the use of tuberculin is made a prominent feature. Unfortunately, it is comparatively easy to give tuberculin on a large scale at dispensaries, and the lay mind is thus easily impressed with the amount of "treatment" which is given at the local dispensary. Whereas, if little or no tuberculin is given, the layman is often unable to see that anything effective is being done. Amongst sanatoria and hospitals, where the treatment is more obvious and freer from lay criticism, tuberculin has in many places been almost entirely dropped, but it is comparatively rare to find a dispensary where such is the case. In this way I believe there is considerable danger of routine tuberculin administration being either forced upon or passively accepted by dispensary officers, the public mind having been obsessed with the claims of "tuberculin dispensaries," and being

slow to appreciate the wider outlook and larger scope of a *tuberculosis* dispensary.

What, then, are the therapeutic possibilities of a tuberculosis dispensary the management of which does not believe in the reputed efficacy of a general administration of tuberculin for dispensary work and only adopts such therapy in limited and special cases? In the first place, such a dispensary must necessarily have definite reasons for its comparative rejection of tuberculin in its work. It would occupy too much space to attempt here to discuss the matter fully, but I may summarize my personal belief as follows:

(1) Tuberculin is admittedly a powerful drug, and, unless used with extreme care, can be, and often is, highly dangerous. To my mind effective and safe tuberculin administration, at any rate in pulmonary cases, can only be carried on under institutional conditions. An *accurate* temperature record is absolutely essential, and it is really absurd to suppose that the average dispensary class of patient can be trusted to keep temperature charts with the requisite degree of accuracy under the multifarious and usually unsuitable conditions of their homes. The temperature charts of dispensary patients can only be considered at best as approximately correct, and are certainly far too rough for checking tuberculin administration as it ought to be checked. The same criticism applies to many of the other symptomatic details required in tuberculin therapy, and which many people seem cheerfully to believe can be obtained with accuracy from the class of man and woman who attends a dispensary once or twice a week. Thus, in my opinion, it is impossible to give tuberculin in other than a more or less empirical way from a dispensary, and since tuberculin is a highly potent drug, such administration is both unsafe and unreliable as a serious contribution to therapeutics.

(2) Innumerable statistics have been published showing the supposed success of tuberculin in dispensary treatment. Admittedly such success is only obtained after prolonged treatment—months or years. During any such period an individual who is attending a dispensary is subject to the influence of many factors in his home life—*e.g.*, the amount and quality of food available, the character of his work or exercise, the details of his own and his family's hygiene and his social surroundings. These vary widely from time to time, and so place him in a totally different position from the patient receiving tuberculin under the regular life and systematized routine of a sanatorium. To state, therefore, that any improvement in a patient's condition, which only takes place after a prolonged period, is necessarily due to the factor of tuberculin as opposed to the multitudinous other influences to which he is exposed, is to dogmatize on the slenderest of evidence The proof of such assertions must rest with those who make them, but,

unfortunately, convincing proof from such uncontrolled experiments is unlikely ever to be obtained. It has been admitted, too, in a recent exposition of tuberculin in dispensary treatment that few, if any, accounts have been published of the results of dispensary treatment *without* tuberculin, and so comparison is almost impossible. Unfortunately this is true, for great has been the tuberculin obsession amongst dispensaries. Personal experience in my own dispensary, where tuberculin has been almost entirely avoided, convinces me that equally good results can be obtained without tuberculin, and I hope at a later date to show my statistical evidence for this belief.

(3) Tuberculin administration is sometimes justified in dispensary work on the ground that it forms an effective means of keeping in touch with patients, quite apart from its therapeutic value. This, I think, is a somewhat unworthy attitude to adopt, for it does not seem ethically or medically sound practice to adopt a form of treatment which is possibly dangerous merely as a bait to secure attendance at the dispensary. The dispensary officer can, I believe, though admittedly with greater labour, by dealing sympathetically and individually with his patients, secure as good attendance from them as by deluding them with the magic of an injection syringe. Unless we are convinced of the therapeutic value of tuberculin, we have no right to use so powerful a drug as a means of attracting or retaining patients.

The question therefore remains, assuming that tuberculin is unnecessary as a routine factor in dispensary treatment, what are the principles upon which treatment must be based? To answer this we must first realize that the "treatment" of a tuberculous person is a highly complex matter, and extends far beyond mere drug administration. The psychology of the tuberculous is a problem which as yet awaits adequate study, but no one who deals with such persons can fail to realize the peculiar psychological make-up of their minds. The tuberculous subject requires individual study, not only from the standpoint of pulmonary or other lesions, but also in regard to his mental characteristics, and the primary requisite in effective treatment of dispensary patients is that the doctor should know his patients in a *personal* sense, that he should study them so as rapidly to acquire their confidence, and make them believe in him and his knowledge of them, and, further, if necessary, they must be taught to fear his disapproval. Such confidence and belief once gained, the problems of treatment become greatly simplified, for it is then possible, with much greater ease, to lay down definite rules of living, to carry out effective home treatment, and to guide and assist the tuberculous patient through the many perils that beset his way.

Having, then, attempted to convince the patient that the doctor understands his complaint (and to do this perhaps the best way is

to try and make him understand the rudiments of it himself), and having as far as possible secured his confidence, I would suggest that the first line of treatment should be an attempt to apply the principles of "graduated exercise." The main rules of this form of treatment can be carried out through a dispensary with distinct success, and it is surprising how soon the average patient can be made to appreciate the scheme of treatment and to carry it out as far as possible. The taking of the temperature is, of course, usually essential, and the approximately accurate charts which are obtained give ample data for regulating the degree of exercise. In this treatment the principle of *graduation* is the all-important point; the details of "exercise" must vary widely with individual cases, but in all the absolute rule of *gradual* progress must be adhered to. By such means a case which initially has marked pyrexia can, as I have succeeded in doing in many instances, be slowly converted into an apyrexial ambulant and working case without the use of tuberculin or other than symptomatic medication, fresh air and good food being, of course, secured to the greatest possible extent for every case, whether being treated on these lines or not.

I do not propose to elaborate the various ways in which graduated rest and exercise must be applied to varying types of case. The principle is well known and universally applied at sanatoria. What I wish to urge is the wider adoption of these principles as a practical and, I believe, effective method of dispensary treatment. It is the substitution of *auto-inoculation* guided by the personal pathology of each individual in place of *hetero-inoculation* given as a routine, for which I contend. Such "tuberculin administration" produces, I believe, equally good, if not better, results than that more commonly in vogue.

In regard to drugs—and their name is legion—none are specific, some are valuable, many are useful, a few are futile. Each doctor will have his own particular favourites beyond the usual recognized essentials, and personally I believe most firmly in the value of an inhalant mixture used on a Burney-Yeo respirator for almost all dispensary cases of pulmonary tuberculosis. Continuous inhalation is, of course, impossible for the majority of dispensary patients, but nearly all, I find, experience definite and rapid relief of symptoms from the frequent use of inhalants in this way. Such treatment has, moreover, two distinct advantages in dispensary work: (1) It is cheap, easily explained, and readily carried out. (2) It diminishes the risk of infection in the patient's home. It is not necessary to limit such treatment to laryngeal cases.

To sum up, the views I have here put forward, I fear with some degree of dogmatism, are as follows: (1) Tuberculin should *not* be a necessary

part of treatment at a tuberculosis dispensary; it is usually not even desirable, because: (i.) Its administration cannot be effectively and safely controlled through a dispensary. (ii.) Its value is problematical, as no reliable statistics are possible under dispensary conditions, owing to the number of factors involved. (iii.) It is not the only way by which the attendance of patients can be secured.

(2) Dispensary treatment of tuberculosis must be based primarily upon an intimate personal knowledge by the doctor of the psychological as well as the pathological conditions of his patient. This is not easy to accomplish, but it is worth much labour.

(3) The principles of "graduated rest and exercise" can be effectively carried out in considerable detail by dispensary patients, and produce excellent results.

(4) The use of inhalants on a respirator is applicable to nearly all cases of pulmonary tuberculosis, and is a valuable adjunct to general treatment.

In this brief survey I have omitted any specific reference to the necessity for enforcing the ordinary hygienic rules in regard to tuberculosis, the visiting of homes, the regulation of diet, etc., such being matters of universal knowledge and application. I have tried to deal with points in dispensary treatment which are less commonly discussed, and my aim has been to show that tuberculin administration is at best but a very small part of a dispensary's activities. The future, I trust, may lie with the "tuberculosis," and not the "tuberlin" dispensary.

SANATORIUM BENEFIT FOR TUBERCULOUS SUBJECTS:

HOW CAN INSURANCE COMMITTEES BEST EMPLOY AVAILABLE FUNDS?

By HENRY A. ELLIS,

M.B., B.PH.,

Tuberculosis Medical Officer, Middlesbrough; late Medical Superintendent of the Coolgardie Sanatorium, Western Australia.

At no time will the value of the life of the efficient be greater to the nation than in the years that follow immediately the present titanic struggle, which is destroying such vast numbers of adults; and one excellent way by which we can reduce shortage is by exercising greater care of our prospective consumptive and other tuberculous subjects.

Tuberculosis is the arch-enemy of the young adult. By the passing of the Insurance Act three years ago the attack on tuberculosis was recognized as a national duty, and the whole anti-tuberculosis campaign entered on a new phase; it might, indeed, be said to have passed from a preliminary stage of preparation to one of definite action—from the static to the dynamic condition. There is no need to undervalue the previous action of enthusiasts, but the co-ordinated action of the State has in great measure replaced voluntary enterprises. This action of the State was necessarily handicapped by the limitations resulting when a great operation suddenly emerges from relatively slight preparation. We are having an ample demonstration of the same limitations on a far greater scale in the conduct of the present war.

Before the days of the Insurance Act, however much difference of opinion there may have been as to the ability and the plans of the persons in charge of the anti-tuberculosis movement, the whole campaign was in the hands of experts and enthusiasts, and the laymen associated were more or less trained, and acted under expert advice of the highest order and with exceptional knowledge and special sympathy. With the advent of the Insurance Act the campaign suddenly passed, on an enormously enhanced scale, into the hands of innumerable local committees, mostly unacquainted with the subject, and many of which had to do all their learning and make all their initial errors without much experienced advice or many administrative precedents to refer to. Of course, like all great reforms, the glamour of anticipation began to wear off with the friction of experience. The most impossible conceptions had been formed of the relief that would be afforded and the capacity of the money at disposal.

It was suggested that all tuberculous persons were to have sanatorium treatment or residence in "first-class hotels"; without delay their dependents were to be treated; their poverty was to be removed by sickness benefits and extra nourishment; contact cases were all to be sought out and dealt with, and the dying taken care of in suitable hospitals and homes. Very little experience showed that the funds available were not nearly sufficient for the materialization of such high ideals, and that even if economically managed financial resources would not provide for a tithe of the anticipated results.

We have now reached a stage when organizers and administrators are groping on all sides to find how best to distribute the very limited sums at the disposal of their committees, and to make the most efficient use of such grants as are available. After that knowledge has been acquired, the question of augmentation must be a pressing one. It is with a view of helping on the first stage of this inquiry that the present paper has been written.

The whole question of the management of tuberculous cases can be subdivided according to the state in which the disease is detected and comes under treatment. We require in a complete scheme the following elements: (1) Dispensaries for recognition and general treatment; (2) sanatoria for rest and observation which shall be annexes to the dispensaries; (3) open-air schools for children; (4) sanatoria for skilled treatment of well-defined active cases; (5) open-air colony centres for continuing treatment; and (6) hospital homes for the mortally wounded.

The first problem that emerges is one of figures. What number of patients must we be prepared to treat in each variety of institution? Of course the proportion will differ in various districts, according to wages, housing conditions, unemployment, and all the other indices of poverty, and the energy and capacity of the committee and the tuberculosis officer.

Recognizing that it is more or less generally admitted that 80 per cent. of the population are tuberculously infected in some form, the outstanding question is, How many show insufficient resistance to the infective agent and can be considered to require treatment? When arrangements are being made for the care of combatants, we have naturally all varieties of wounds to prepare for, from the scratch to the sword-cut, from the case which should easily recover to that which indicates an immediately fatal result.

With a view to elucidating the problem for my own committee, of how many persons may reasonably be estimated at any one time to have their resistance lowered sufficiently to require treatment, I have taken out the figures so far available in the district of Middlesbrough among the insured persons, who comprise roughly one-third of the population, and these figures suggest some very interesting points.

TABLE I.—INDICATING INSURED CASES NOTIFIED AS TUBERCULOUS IN THE DISTRICT OF MIDDLESBROUGH.

Year.	Number of Insured Persons.	Notified suffering from Tuberculosis.	Per Thousand.
1913	36,593	67	1·5
1914	44,815	152	3·7
1915 (approximate)	45,380	112 (notified in 6 months)	4·9

The above returns must be far below the actual number existing, as of the 112 so far reported in this year 41 are in Class III., as defined below, and 16 or 18 per cent. are already dead—probably they have been ill on an average over two years. This duration is further emphasized by the observation that, of the 67 cases reported in 1913,

48 per cent. are dead, and of the 152 reported in 1914, 37 per cent are dead. The real proportion of active cases is probably nearly double, and will be between 5 and 10 per thousand.

The next problem will be the relative proportions of the various classes to each other, and their probable duration of life. For this purpose I have divided my patients into three classes, as follows:

Class I. comprises the classification of the Astor Committee, 1 and 2—cases who are definitely affected, but their health not materially interfered with when the disease is arrested.

Class II. comprises groups 3 and 4 of the Astor Committee—acute serious cases and cases of some standing, who have a considerable area of lung involved. When the disease is arrested in this class, they will never be as effective as before.

Class III. includes chronic cases with large area of lung involved. There is no reasonable prospect of a cure or of returning to efficient work in this class.

TABLE II.—INDICATING CLASS OF CASE NOTIFIED IN 1913 AND 1914 IN MIDDLESBROUGH DISTRICT.

1913.	1914.
67 notified cases. 6 not attending. — 61 cases.	152 notified cases. 13 not attending. — 139 cases.
6 in Class I. Of which 4 are still in Class I. ,, 1 is in Class II. ,, 1 is in Class III.	15 in Class I. Of which 11 are still in Class I. ,, 4 are in Class II.
13 in Class II. Of which 6 are still in Class II. ,, 7 are in Class III.	22 in Class II. Of which 13 are still in Class II. ,, 9 are in Class III.
42 in Class III. Of which 32 are dead. ,, 10 are still in Class III.	102 in Class III. Of which 54 are dead. ,, 48 are still in Class III.

The above table shows in the most striking manner the value of early recognition and treatment; and as these figures are drawn from the results of my predecessor, I have no bias in the matter.

Table III. shows the proportionate results, including those of the present year, and emphasizes the important facts that, for the present at any rate, successful treatment makes apparent a larger number of cases, and at the same time provides for their detection at an earlier stage, altering the proportions from more serious to less serious.

TABLE III.—INDICATING PERCENTAGE OF TUBERCULOUS CASES IN VARIOUS GROUPS.

	1913.	1914.	1915.
	Per Cent.	Per Cent.	Per Cent.
Class I.	9	13	29
Class II.	21	15	34
Class III.	70	72	37

On our present roll we have 84 cases in Class III., 65 in Class II., and 55 in Class I. The figures for the complete year will probably be more than double those shown. But taking the figures as they are, it would appear that for an insured population of some 45,000 we require about 23 beds for Class III. in some institution for advanced cases, 12 beds for Class II. in sanatoria for treatment of well-defined cases, and a similar number of places in colonies for their after-treatment. Class II. cases would on the average want about six months' treatment. As for Class I. cases, I think they could be treated in an institution which is a kind of annexe to the dispensary, and about 10 beds would be required, the average treatment being about one to three months. Of course there is no insuperable obstacle to the provision for the two best classes being under the same roof. The above estimate of Class I. is based on actual experience here. I am using my available beds for treating Class I., which require from one to three months' rest and treatment to re-establish their resistance and overcome their disease.

The above figures show that more than 45 beds of the various types are necessary for an insured population of 45,000, or 1 bed per 1,000 without the colony. There is in addition a dispensary roll of 204.

Now, what funds are available for handling these numbers? The following table shows the actual figures for the borough of Middlesbrough:

TABLE IV.—INDICATING EXPENDITURE ON TUBERCULOUS CASES IN MIDDLESBROUGH.

		1913.	1914.	1915 (estimated).
Institutional treatment		£1,012	£1,241	£800
Extra nourishment		90	270	135
Total		£1,102	£1,511	£935
Balance carried forward ...	1912. £703	£507	nil	nil

It should be noticed that, while the work is increasing, the money available is decreasing.

What has been the result of the money already expended here on sanatorium treatment at a cost of £2,500? Here are the returns:

134 have received institutional treatment.
45 dead, or 33½ per cent.
34 hopeless, or 25 per cent.
11 no record, or 8 per cent.
35 have done well, or 26 per cent.

The question now forces itself, Can we not do better? Are we not spending the small available funds at the wrong end—giving doles with a view of piling up numbers rather than with a view to achieving any worthy success? Will it not pay the Insurance Committees and the nation better to spend most of their present available money on Class I. patients with a view of returning them to full active life? Shall we not jettison some of our hopes and try to aim at a more limited and realizable objective, at least until we have more funds available? The question is insistent and urgent in view of the national need, and demands careful discussion.

I have before me a report of one area with over 800,000 population and institutional accommodation for 249 cases. They have on their waiting lists 251 cases, which at their normal rate of taking in (their discharges are about 77 monthly) will have to wait at least three months before institutional treatment is available, ample time for a case to pass from Class I. to Class II., when it will involve at least double the expense on the committee, with half the result; for the patient will have lost his chance of permanent benefit, and will have exhausted his sick pay, etc., which will have been used before sanatorium treatment, instead of after, as it should be. After discharge he will be practically fundless, and this is when he needs money most. The problem is, Would it not be far better to select the best cases for immediate admission?

These questions demand serious consideration, and various Insurance Committees are looking for light and direction. They have lost their way and are in doubt. Some are getting hopeless and are fast losing their enthusiasm, and will, if they see no better results, presently get apathetic. Let us ask boldly: Can we not get better results with the money even now available? Are good results not better than mere numbers? Can we not get more funds, so that the financial position and the work which should be done can be brought more into co-ordination? Or shall we still shirk the issue, and pile up numbers for annual reports, knowing that a considerable proportion of these cases are being dealt with without any possibility of lasting amelioration in their condition?

NOURISHMENT FOR THE TUBERCULOUS: AN ANCILLARY TO TREATMENT.

By W. B. MILESTONE,
A.F.I.,
Clerk to the Middlesbrough Insurance Committee.

The National Health Insurance Act, 1911, Section 8 (1) (*a*), defines Medical Benefit as "Medical treatment and attendance, including the provision of proper and sufficient medicines, etc." The word "treatment" here is evidently limited to personal attendance by the medical practitioner, and does not include the provision of drugs, etc. Section 8 (1) (*b*) defines Sanatorium Benefit as "Treatment in sanatoria, etc., or otherwise." The word "treatment" here has evidently a different meaning to that in Section 8 (1) (*a*). Treatment has been extended by various orders, decisions., etc., to include the provision of drugs and nourishment when sanatorium benefit is granted in the form of domiciliary treatment.

This extension has doubtless been forced on the Insurance Commissioners and the Local Government Board by political pressure. It introduces considerable difficulties in the administration of the very inadequate funds at the disposal of Insurance Committees. The Commissioners themselves have evidently experienced embarrassment from this extension of the meaning of the word "treatment." This is shown by their recent explanation of the limits of this extended definition, which can be summarized as follows:

"It is not the function of a Committee to provide any part of the dietary which insured persons in general may themselves be expected to provide in connection with their ordinary sustenance, or to make good any deficiencies in the standard of that dietary which may exist in the case of individual patients. The functions of a Committee are limited to the provision of treatment; and just as a doctor in attendance upon a tuberculous patient enjoying a normal standard of sustenance might advise the addition to his dietary, as part of the course of treatment recommended, of some special or extraordinary nourishment, a Committee would be entitled to provide for an insured person receiving domiciliary treatment, to such extent as they thought fit, such special or extraordinary nourishment as the doctor in attendance recommended as part of, and necessary to, the treatment. A Committee should have regard primarily to the relative requirements of the patients from the medical point of view."

A patient in receipt of domiciliary treatment for tuberculosis is for all intents and purposes a patient receiving medical benefit for tuberculosis. There are arguments in favour of the supply of nourishment

in all cases receiving medical attention where there is privation. The State should provide money for raising and maintaining the standard of nourishment for both tuberculous and non-tuberculous patients, if medical benefit is to attain its full value.

The question for the moment, however, is how best to administer the limited funds which have been provided for a specific purpose—*i.e.*, the so-called curative treatment of tuberculosis; and the attainment of that purpose is being made more difficult by the diversion of a portion of the funds to objects which, however deserving, were never intended to be covered by those funds, and for which the funds are insufficient. Committees must realize that it is their first duty to apply those limited funds for the purposes *of the medical treatment of tuberculous patients*, and to do justice as between the relative merits of the respective applications before them.

There are other agencies for dealing with distress, and if they are inadequate they should be supplemented by a State provision for the case of needy persons in receipt of treatment, not only for phthisis, but also for other chronic diseases. The case for such a State provision is, however, considerably weakened if the need in phthisis is cloaked by the improper application of the Sanatorium Benefit Funds. Once admit the principle that, when a patient is lacking in the ordinary articles of diet, it is the function of a Committee to supply that deficiency from the Sanatorium Benefit Funds, and the whole amount at present available for the treatment of tuberculosis will be absorbed by this expenditure alone.

If, in dealing with applications for domiciliary treatment with extra nourishment, the Committee do not clearly define their policy, there will be inevitable inequality in the treatment of equally deserving patients owing to the varying state of the funds—a most undesirable result. For example, a number of applications might come before a Committee in, say, March or April, at a time when the funds for the year had not been encroached upon to any very considerable extent, and the Committee might decide to grant the treatment and give the nourishment. A similar number of applications might come before the Committee in October, or later on in the year, and at a time when the Committee had probably spent its income for the current year. It is almost certain that some inequality in the treatment of the various applications of March and October will arise unless a definite line of policy be laid down, and this must mean confinement of ancillary allowances within very well defined limits.

In an area such as Middlesbrough, even with the most careful management, no less than £300 out of a total available income for all purposes (apart from the "domiciliary 6d.") of £1,400, or more than 20 per cent., is spent on nourishment ancillary to treatment. In many

areas the proportion is higher. It is obvious, therefore, that the funds available will not bear the strain if they are to provide other treatment of any value.

It has long been held that it is absurd to spend money in endeavouring to pack intellectual food into the starved brains of poor school children. It is even more absurd to lavish medicines and skill on the unnourished tuberculous invalid. The State should face this fact, but it will never be properly faced and met until the cloak provided by the present methods is removed. Insurance Committees should insist on exposing this absurdity by refusing ancillary nourishment from their present scanty funds, and devote their income mainly to the provision of suitable treatment for hopeful cases in institutions where the patient is fed. Let the State find the way of satisfying the other needs.

ANTIFORMIN AND THE EXAMINATION OF TUBERCULOUS SPUTA.

By WALTER J. MATTHEWS,
Assistant in the Laboratory of the Municipal Tuberculosis Dispensaries, Bristol.

The examination of sputum in cases of pulmonary tuberculosis is of such importance that I should like to draw attention to the advantages obtained by the use of antiformin in the general routine examination of the expectoration of tuberculous subjects. It has proved a great asset in our dispensary work, and the extra time entailed by its use is well repaid by the excellence of the results.

Antiformin has been employed for the concentration of the tubercle bacilli in sputum, so that very scanty numbers may be more readily detected, and also for obtaining pure cultures of the tubercle bacilli direct from sputum; it enables one to attain both ends with conspicuous success.

Besides dissolving other micro-organisms and particles of pulmonary tissue, the main advantage obtained by the use of antiformin is that it allows of large quantities of expectorated matter being concentrated to a very small volume; for example, the quantity of sputum ejected in one day may be so concentrated as to lie on the cover-glass of an ordinary microscopic slide. By the use of antiformin I have found tubercle bacilli in 10 per cent. of the films which had given negative results by all other methods, and I have also been able to obtain pure culture of the tubercle bacilli on Dorset's egg media direct from sputum sent in by the patients. I have also used antiformin with success in

some cases where the diagnosis has been doubtful, and after all other methods have only given negative results. Our experience shows that for diagnostic purposes antiformin is of great value; in fact, I think that all negative results obtained without its use should be considered absolutely worthless.

There are several ways in which antiformin may be employed, but I find the following method gives best results:

Equal parts of antiformin and sputum are well shaken together in a large test-tube until the sputum is dissolved and a homogeneous mixture secured. Five volumes of water are then added, and the mixture again shaken. Equal volumes of acetone ether are then added and the test-tube thoroughly shaken. After a moment a clouded ring will appear below the ether; this is collected by means of a pipette or by the use of a platinum loop, which I find best, and spread on a slide.

The specimen is then stained in the ordinary way according to the Ziehl-Neelsen method, or by the use of Spengler's picric acid stain. The latter method, in my opinion, is the best, and I would suggest that if picric acid stain is employed a better background can be obtained by counter-staining with methylene blue.

It may be of interest to state that antiformin can be made by passing chlorine into a 15 per cent. solution of sodium hydrate up to nearly the saturation point. The chlorine may be best prepared by adding pure hydrochloric acid to manganese dioxide. To make 1 litre, 1 pound of pure acid (sp. gr. 1·16) and about 6 ounces of manganese dioxide are needed. The manganese dioxide is placed in a large flask, and the acid added gradually through a thistle funnel, warming very gently. The chlorine is carried to the bottom of the soda solution, which is placed in a tall bottle, by a delivery tube. Enough chlorine has been added when the soda solution acquires the colour of lemonade. The cost of making a litre works out at about 1s. 1d.

INSTITUTIONS FOR THE TUBERCULOUS.

THE NORTHAMPTONSHIRE SANATORIUM, CREATON.

THIS Institution was started by the Local Branch of the National Association for the Prevention of Consumption, for the treatment of early tuberculous cases. It was formally opened by the Marchioness of Exeter in June, 1910. The management is in the hands of a House Committee, who are members of the Association. The sanatorium,

THE NORTHAMPTONSHIRE SANATORIUM, CREATON.

which contains fifty beds for the reception of male and female patients, is about eight miles from the town of Northampton. It is situated on a southern slope 380 feet above the sea-level, and is surrounded by extensive pleasure-grounds and farm-lands of about 90 acres. The climate is dry and bracing. Each ward is constructed on the open-air principle, and contains two beds. The institution has been approved by the Local Government Board, for the reception of patients under

the National Insurance Act. The inclusive terms are from 30s. per week. The secretary is Mr. Clifford Towers, Lloyds Bank Buildings, Northampton. All communications concerning the admission of patients should be addressed to the Medical Superintendent, Dr. J. A. Kilpatrick, at the sanatorium. Telephone No. 9, Creaton. Telegraphic and Postal Address: "Creaton." The nearest railway station is Brixworth (three miles) on the London and North-Western Railway.

THE NORTHAMPTONSHIRE SANATORIUM, CREATON.

A revised "List of Sanatoria and Other Residential Institutions" has just been issued by the Local Government Board, and will be found invaluable for purposes of reference.[1]

[1] "List of Sanatoria and Other Residential Institutions approved by the Local Government Board under the National Insurance Act, 1911, for the treatment of persons suffering from Tuberculosis, and resident in England (excluding Monmouthshire), with the names of the Administrative Counties and County Boroughs in which the Institutions are situate, and the date on which the approval expires in each case." London: Wyman and Sons, Ltd., 1915. Price 1d.

NOTICES OF BOOKS.

THE TUBERCULOSIS MOVEMENT IN WALES.

THE King Edward VII. Welsh National Memorial Association for the Prevention, Treatment, and Abolition of Tuberculosis, incorporated by royal charter May 17, 1912, has accomplished remarkable service in the Principality, as is evident from the Third Annual Report recently issued.[1] Lieut.-Colonel David Davies, M.P., is President of a very influential and representative Board of Governors. Dr. Marcus Paterson acts as Medical Director. This chartered body has now entered on its fourth year, and, having overcome initial difficulties, occupies a controlling position in Wales, and is conducting a tuberculosis campaign with discretion and success. The capital expenditure of the Association, including the gifts of the West Wales Sanatorium and the Penhesgyn Home, amount to £100,452 4s. 1d. No less a sum than £19,256 5s. 8d. has been paid to various institutions taking Welsh patients during the year, usually at the rate of 30s. per bed weekly. The Association has in its own hospitals 183 beds. The total number of hospital beds at the disposal of the Association is 418. There are also 257 beds in sanatoria owned or leased by the Association, and 128 in other institutions, making a total of 385 beds. The medical report shows that during the year no fewer than 8,868 persons presented themselves for examination—4,752 males and 4,116 females. The number of boys and girls was practically equal, but whereas there were 3,121 men, there were only 2,460 women. This, however, is an increase of over 100 women who presented themselves last year, whereas the number of men is 100 less. This falling off in the number of men is accounted for by the fact that many men have joined the army. Last year the number of women found tuberculous was 72 per cent. of those examined; this year it has fallen to 52 per cent. This disproportion between the number of men and women is a subject to which attention is to be given in the future. The number of contacts examined has increased. For the last year the total was 1,484, of whom 360 were found to be suffering from tuberculosis. For the year just closed the numbers are 1,808 and 416 respectively. The results of treatment in sanatoria appear to be gratifying. Of the number discharged, no less than 69 per cent. of pulmonary cases and 80 per cent. of non-pulmonary cases were discharged as fit for work. No fewer than 250 patients were discharged during the year from hospitals as being fit for work. No less than 836 patients attending at the tuberculosis institutes and visiting stations have been discharged as being fit for work. The Medical Committee have had under

[1] The King Edward VII. Welsh National Memorial Association (The Prevention and Abolition of Tuberculosis). Third Annual Report, for the year ended March 31, 1915. Pp. 170+Appendix, pp. 25. Published at the Memorial Offices, Westgate Street, Cardiff, by the Educational Publishing Company, Ltd., Penarth Road, Cardiff. 1915.

consideration the medical supervision of patients after discharge from institutional treatment. The Report contains a striking diagram which indicates the excess incidence in females over males between twenty and twenty-five, and in males over females from thirty onwards. We are particularly glad to see that special attention is being directed to the treatment of tuberculous children. The Medical Committee have adopted the following report: "(1) It appears that the average attendance of school children throughout Wales and Monmouthshire is approximately 400,000. (2) It is difficult to estimate with any degree of accuracy the number of the school children in attendance who are tuberculous, but it was felt that 1 per cent. (4,000) was a fair estimate; that, of this 4,000, 75 per cent. would be cases of glands requiring no active treatment; and that, of the remaining 25 per cent., 66 per cent. might be classsed as pulmonary. This percentage is based upon the experience of the Association during the year ended March 31, 1914, actual experience showing that about 17 per cent. of the children found to be tuberculous were suffering from pulmonary tuberculosis. (3) The Sub-Committee inclines to the opinion that the provision proposed to be made for the treatment of children suffering from pulmonary tuberculosis at the two sanatoria of the Association now in course of erection may be found to be sufficient for the present purposes. (4) A number of these cases of pulmonary tuberculosis can of course be treated at home and at the institutes of the Association; and, for those requiring treatment in a hospital, the number of beds provided in the scheme of the Association will probably be found to be sufficient. The Sub-Committee desires to point out that no specific differential provision for children has been made in hospitals. (5) With reference to non-pulmonary cases, these divide themselves into two classes—(*a*) so-called surgical, or bone, tuberculosis; and (*b*) glandular cases. (6) As to surgical, or bone, tuberculosis, the Sub-Committee found it difficult to estimate the number of beds required at the various institutions, but is of the opinion that, with the facilities which will be available at some of the more populous areas in Wales and Monmouthshire, the provision of an additional pavilion at the South Wales Sanatorium, Pontywal, Talgarth, for a further seventy-five beds, and an additional pavilion at the North Wales Sanatorium, Plas Llangwyfan, Denbigh, for a further fifty beds, may be regarded as the minimum immediate provision. (7) As to glandular cases, the Sub-Committee, after a long discussion, came to the conclusion that provision should be made for children suffering from enlarged glands, whose general health is indifferent, and who may therefore reasonably be supposed to be suffering from tuberculosis. The Sub-Committee recommends that, in connection with this most important part of the campaign for prevention, the two institutions belonging to the Association at Penhesgyn (Anglesey) and West Wales (Llanybyther) should be utilized. These would provide at least 100 beds for this purpose. (8) In conclusion, the Committee desires to point out that, while full consideration has been given to the medical statistics included in the last Annual Report of the Association, and to elaborate analyses thereof, no deduction can be made therefrom which would be of real value in presenting a report to the Medical Committee on the question of the provision of treatment for children. While a very large number of children have been referred to the officers of the Association

for diagnosis and treatment, the Sub-Committee is fully alive to the fact that very many cases exist in the Principality which have not yet been referred to the Association." These proposals indicate the settled policy of the Association regarding the treatment of tuberculous children; but, unfortunately, the war has interfered with the development of the policy. The Welsh Insurance Commissioners, when asked for their approval, pointed out that the scheme meant the provision of 141 additional beds (viz., 75 at the South Wales Sanatorium, 50 at the North Wales Sanatorium, and 16 at Penhesgyn, Anglesey), involving an annual expenditure (at £65 per bed) of £9,165 on maintenance, and added that "under the circumstances, and especially having regard to the financial position of the country, the Commissioners are strongly of opinion that the whole position should be placed before the County and County Borough Councils, and that no extension of the Association's scheme should be approved until the local authorities have entered into agreement for a reasonable term of years." In view of this communication, the Medical Committee and the Finance Committee reconsidered the proposals, and, acting upon their recommendation, the Council has perforce resolved that for the present the erection of the proposed additional pavilions at the North Wales and the South Wales Sanatoria, for the treatment of surgical cases in children, be not proceeded with. Arrangements are, however, being made for the treatment of such children within the buildings now in course of erection for the North Wales and South Wales Sanatoria. At the request of the Medical Committee, Mr. Lynn Thomas and Mr. Robert Jones have prepared a joint report upon the whole question of the treatment of surgical tuberculosis. Meantime the Open-Air Home at Penhesgyn, Anglesey, is being made ready for the treatment of children suffering from glandular tuberculosis, and, as soon as the South Wales Sanatorium at Pontywal, Talgarth, is opened, the West Wales Sanatorium at Llanybyther will also be used for children suffering from glandular tuberculosis. The acquisition of Sir Garrod Thomas's mansion at Clytha Park, Newport, will also considerably facilitate the further progress of the scheme for the treatment of children. The arrangement made with the Committee of the Lord Mayor Treloar Cripples' Hospital and College, Alton, enables the Association to place as many as seventy-one patients in that admirable institution, all occupying beds at one and the same time. We are glad to note that under the direction of Dr. R. Owen Morris progress has been made in educational work. Those interested in the provision of lectures and demonstrations should study the excellent syllabus of Lectures to School Children and Lectures to Teachers. The Report of the Medical Director contains many statistical tables of much interest. Dr. Paterson enumerates the following main facts as indicative of progress: "(1) The diminution in the number of new cases of pulmonary tuberculosis diagnosed, although the total number sent for examination has slightly increased. (2) The improvement in the type of the disease of patients admitted to sanatoria; the proportion of cases likely to respond well to treatment is steadily increasing. (3) The fact that sanatorium accommodation has been available for *all* suitable cases for several months. (4) The slight reduction that has been made in the disproportion between the number of women and the number of men found to be tuberculous." The following table shows the total number

of cases examined in 1912, 1913, and 1914, and indicates the number and percentage suffering from pulmonary and non-pulmonary tuberculosis, and those found not to be afflicted with active tuberculosis:

Year.	Total Number examined.	Diagnosed Pulmonary Tuberculosis.	Diagnosed Non-Pulmonary Tuberculosis.	Cases showing no Evidence of Active Tuberculosis.	Number still under Observation pending Diagnosis on March 31.
1912—nine months only	3,240	2,061, or 63·61 %	224, or 6·91 %	686, or 21·17 %	269, or 8·30 %
April 1, 1913, to March 31, 1914	8,763	4,470, or 51·01 %	742, or 8·46 %	3,191, or 36·41 %	360, or 4·10 %
April 1, 1914, to March 31, 1915	8,868	3,544, or 39·96 %	793, or 8·94 %	3,767, or 42·47 %	764, or 8·61 %

Dr. Paterson indicates that the Association has to contend with a defective public opinion. "While the Association has done much, and proposes to do more, it has not yet received from the general public the co-operation which is absolutely necessary for the eradication of tuberculosis. In spite of all the educational efforts which have been made to bring home to the general public the principal facts concerning tuberculosis, there is still a want of their proper appreciation, which is, and will be, a great hindrance in the achievement of the Association's object, and renewed efforts must be made to remove this obstacle. The statement that pulmonary tuberculosis is a disease which one human being can communicate to another has deeply taken root. The knowledge that a person suffering from tuberculosis need not be a source of conveying the disease to anyone, if certain precautions are adopted, does not appear to have kept pace with the first lesson. It is not sufficiently realized that although the expectoration contains the germs of the disease, yet if this material be collected and properly treated it can be easily rendered inert. The seeds of a disease which can so easily be gathered and destroyed should easily be controlled. The cause of the disease is known, and, as it has just been stated, one of the main channels of its spread is understood and effective measures of destroying the seed are readily available. It may seem unnecessary to reiterate these facts, and yet they have not sunk into the public mind. The proof of the statement is a simple one. Every person suffering from tuberculosis who is allowed to go about his or her daily occupation should carry a sputum-collecting bottle, instead of spitting on the floor or into handkerchiefs (and it should be thoroughly realized that to spit into a handkerchief, so far as the spread of the disease is concerned, is just as bad as spitting on the floor). Each patient diagnosed as suffering from pulmonary tuberculosis has been supplied with a sputum flask. Let every person who reads this part of the Report endeavour to recollect how many of these flasks he has seen in use, either in railway trains, tramcars, or other places. There

is no doubt that these flasks are used at home by the patients in order to protect their own relatives. Equally, there is no difficulty in institutions in persuading the patients to spit always into flasks. Why, therefore, when they return to the towns and villages will they not use them in public? The answer, I think, is simple. Their use is easy in a sanatorium or hospital because those persons who do not need to use flasks are sympathetic towards their employment by the persons afflicted with tuberculosis, and nothing but encouragement is given to the patients to make every possible service of these collectors. Yet what is the picture we see when the tuberculous person mixes with the public? The person who is careless either through ignorance or indifference to the spread of the disease to his fellow-creatures, whether in a public conveyance, public-house, theatre, or cinema hall, may spit promiscuously, and he will probably be tolerated, although not liked. It is, of course, considered to be completely in order for anyone to expectorate into his or her handkerchief. Both these methods of disposing of the pulmonary discharges are capable of spreading infection. Let, however, a patient who has been properly trained in the collection of the bacilli take out his sputum flask in a railway carriage, and everybody will flee from him. In fact, it is practically only necessary to carry a sputum flask and exhibit it to have a railway carriage to oneself. This would almost seem humorous if it were not so very serious. It means that those patients who are willing to collect and properly dispose of the seed are to be discouraged in every way from carrying out what they know to be right when mixing with their fellow-creatures. Patients are perfectly willing in most instances to take all necessary precautions, and they certainly do take them in nearly all cases to protect their own family, who are only too glad to co-operate with them; but they soon fail to see any reason to advertise that they suffer from tuberculosis, and in consequence are to be looked upon as lepers. To use a sputum flask, in the present state of public opinion, may mean the loss of a man's job. Until the time comes when the man in the street realizes that he is safer with the person with pulmonary discharges who expectorates into a flask than with anyone without such precaution, so long will the spread of the disease be continued. These are stern facts. Tuberculosis is an invisible foe. The person capable of spreading infection can keep the knowledge to himself and spread it. What is the reward by doing his duty to his fellows? When one hears such remarks as, 'I cannot understand how my son suffers from the disease. There is none in the family. His grandparents and all his relatives were strong and healthy, and there is no trace of it in the family,' one wonders why these elementary facts fail to be realized." The whole Report merits careful study, and all concerned in its preparation and the conduct of the excellent work it represents merit congratulations.

PHYSICAL EXERCISES FOR THE CONSUMPTIVE.

Physical exercises carefully arranged and wisely ordered are undoubtedly often of real service in developing powers to resist various forms of disease. In many cases of tuberculosis rationally conducted exercises may prove of considerable advantage. Dr. F. Sylvan has

prepared a manual[1] which provides directions and illustrations for the carrying out of a series of exercises which he considers are of special advantage in dealing with tuberculous subjects. As is common with enthusiasts and advocates of special systems, the author appears to think he will advantage his own methods by decrying other procedures. He claims that "sanatorium treatment for consumption has proved to be a failure," urges that "the present opinion that we should fight tuberculosis by exterminating the tubercle bacillus is radically wrong, and must be given up," and contends that "only by curing the *predisposition* to consumption can we fight the disease." Dr. Sylvan admits that his theories are original and "do not fit in with the present views of the medical authorities." The book contains a special "preface to medical men," which contains various suggestions regarding the employment of the exercises, and at the end appear these words: "Although from the foregoing instructions it might appear that this is a very simple way to cure consumption, yet all medical men will at once realize that it requires much thoughtful and conscientious care, as well as experience, to use these means with complete success. Of course, these exercises can be used with great benefit by anyone suffering from delicate health of any kind." The book would appear to be written for non-medical readers. We cannot but feel that much of the teaching of this monograph is not only erroneous, but dangerous. Dr. Sylvan appears to doubt the infectiousness of tuberculosis, and writes: "All writers agree that a predisposition is necessary to acquire the disease; consequently an ordinary healthy person cannot become infected, and therefore the danger for him to live in the same house as a consumptive patient is nil"; and, further, dogmatically asserts that "the whole problem of tuberculosis concentrates, therefore, upon the predisposition." He also writes loosely regarding "the cure of the predisposition." The author's classification of consumptive patients scarcely seems adequate: "(1) Cases where deficient respiration is more pronounced than other symptoms. (2) Cases where deficient circulation and deficient regulation of the body temperature are more pronounced than other symptoms. (3) Cases where the various symptoms are about equally pronounced." No doubt sanatorium treatment often fails, and we all recognize its limitations; but surely Dr. Sylvan shows irrational prejudice when he says: "Whether one single patient with developed consumption was ever cured by sanatorium treatment is more than doubtful." And many would oppose his contention that "the general introduction of sanatorium treatment has a decidedly detrimental effect upon the community." And as to tuberculin-therapy the following dogmatic assertion is made: "The use of tuberculin ought to be prohibited altogether, because even in cases where tuberculin seems to reduce the tubercle bacilli it is of very little value, if any at all, and frequently does the patient harm." It is difficult to follow the mental processes of the author of this remarkable one-eyed book. He holds that "the various features of the predisposition are physical conditions, and can only be remedied by physical means." The "physical means" advocated are fully described and illustrated, and notes of cases are given. No doubt suitable exercises,

[1] "Consumption, and its Cure by Physical Exercises." By Filip Sylvan, M.D. Pp. xx + 203. London: Kegan Paul, Trench, Trübner and Co., Ltd., Broadway House, 68-74, Carter Lane, E.C. 1915. Price 3s. 6d. net.

carefully conducted under reliable supervision, may in wisely selected cases accomplish some benefit; but if tuberculous patients are to be encouraged to enter on courses of physical exercise independent of medical care and control, disasters will result. And yet the author of this book evidently hopes his volume will popularize "Home Exercises for Consumptive Patients." The matter is one of great importance, and we would not misrepresent the author's intentions, so venture to quote the following from the concluding chapter: "As it will be some considerable time before a sufficient number of medical men have made a study of gymnastic treatment thorough enough to enable them to give such treatment to the enormous numbers of consumptive people in this country alone (it is estimated that in the United Kingdom 60,000 persons develop consumption every year), I will describe a few simple exercises which the patients can perform at home without any aid, and which, if used carefully according to my directions, will be very useful in combating the disease. I cannot give instructions for exercises suitable to each individual case, but the great majority of consumptives are sure to derive much benefit from these exercises if they perform them carefully and with regard to all advice I give for each special exercise. I have found patients even in far advanced stages of consumption, and where other treatments had failed, to be completely cured by using these home exercises."

THE TUBERCULOSIS NURSE.

In the tuberculosis campaign the tuberculosis nurse occupies a foremost place. A valuable manual dealing with the functions, qualifications, and work, of the tuberculosis nurse, has recently been published.[1] The work is one of exceptional interest and value, and should appeal not only to nurses engaged in tuberculosis work, but to Medical Officers of Health, Superintendents of Nursing Associations, members of Health Committees, and, indeed, all responsible for, or engaged in, the organization and administration of measures for the arrest of tuberculosis and other preventable diseases which affect the community. The work is certainly one of the most practical and serviceable manuals dealing with the home management of tuberculous cases. It is written by a long-experienced trained nurse who has been in intimate contact with public health work, and yet understands the details and special difficulties of individual care and control of the tuberculous poor. The work is based upon eight years of special tuberculosis work in Baltimore. Dr. Louis Hamman, the Physician-in-Charge of the Phipps Tuberculosis Dispensary at Johns Hopkins Hospital, in his suggestive introduction, says that "the tuberculosis campaign of the past fifteen years has taught us two important lessons: First, that the tuberculous cannot be isolated in their homes; second, that they cannot be cured in or out of sanatoria." And he goes on to add: "The most direct and effective way of dealing with the tubercle

[1] "The Tuberculosis Nurse: her Function and her Qualifications. A Handbook for Practical Workers in the Tuberculosis Campaign." By Ellen N. La Motte, R.N., Graduate of Johns Hopkins Hospital; former Nurse-in-Chief of the Tuberculosis Division, Health Department of Baltimore. Introduction by Louis Hamman, M.D., Physician-in-Charge, Phipps Tuberculosis Dispensary, Johns Hopkins University. Pp. xxiii + 292. New York and London: G. P. Putnam's Sons. 1915. Price 6s. net.

bacillus is to isolate as many advanced consumptives as is possible." Miss La Motte also agrees in urging the importance of institutional care of advanced cases of pulmonary tuberculosis. The book is eminently practical. It provides excellent advice regarding the training, selection, duties, and general conduct, of the tuberculosis nurse. Wise advice is given regarding the nurse's relation to the medical adviser, the patient, and the patient's family and friends. There is much detailed direction regarding the technique of the nursing and general hygienic management of tuberculous patients. The work is one of such sound sense and practical service that we commend it to the notice of all engaged in the organization and conduct of systematic and scientifically directed efforts to prevent and arrest tuberculosis and render effective aid to tuberculous sufferers.

HOUSING AND TUBERCULOSIS.

"The clinical and pathological aspects of disease have proved such attractive fields for study that physicians have not given the relation between disease and social conditions the attention its importance demands. This indifference has of late years been replaced by an increasing interest in the varied and complex social conditions, with a view to determining what bearing they may have upon disease, this interest being in a large measure due to the widespread interest in tuberculosis, a disease peculiarly and intimately connected with every phase of the living and working conditions of the individual. No study of economic conditions is complete that does not take into consideration disease as a factor, and no study of disease can be considered exhaustive that does not take into account the living conditions and social customs of the people affected. These conditions and customs are of importance not only from their bearing upon the mode of infection, transmission, and causation of disease, but also from their influence upon the progress or course of disease." These are the opening sentences of the preface to Dr. Craig's monograph on Housing and Social Conditions.[1] This is the record of an investigation of certain districts in Philadelphia, and it should serve as a model for similar researches in other large centres. One aspect of the conclusions reached merits special consideration: "It is impossible, however, to make a study similar to the foregoing without being impressed by several fundamental facts, the most striking of which is the very inadequate measures adopted to protect the people against disease. The analogy between crime and disease is very close, and the means adopted for the prevention of one could be equally well applied to the other. There is one large proportion of the population that education alone is sufficient to prevent from performing acts prejudicial to the public welfare; the remainder are only prevented from such acts by police supervision. The problem of the health of the public will never be solved until a vigorous, widespread campaign of education has reached the first, and sanitary police, or inspectors with police powers, are provided for the second group."

[1] University of Pennsylvania: Eleventh Report of the Henry Phipps Institute for the Study, Treatment, and Prevention, of Tuberculosis, A Study of the Housing and Social Conditions in Selected Districts of Philadelphia. Pp. 89, with chart. By Frank A. Craig, M.D., Instructor in Medicine. Published by the Henry Phipps Institute, Seventh and Lombard Streets, Philadelphia, U.S.A. 1915.

MEDICAL EMERGENCIES.

The prevailing prejudice to everything German should not blind us to benefits we owe to Teutonic scientists and contributors to the science and art of medicine. An English edition of Dr. Lenzmann's practical treatise on "Emergencies in Medical Practice" has recently been issued, although its preparation was evidently arranged for, if not completed, long before the outbreak of war.[1] The volume has been specially planned to meet the needs of busy practitioners suddenly called upon to deal with urgent disorders in which prompt recognition and effective treatment are vital considerations. The book has been found of much service, and has been translated into Spanish, Italian, and Russian. The author has clearly indicated that his work is not to be viewed as a pocket vade-mecum, but is intended rather as a foundation for thorough study. The main substance of the volume is conveniently grouped according to the chief systems of the body. There are also sections dealing with morbid conditions endangering life arising in the abnormal course of pregnancy, labour, and child-bed, and various forms of poisoning. There is a good index, but, strange to say, tuberculosis has no place in it. There is, however, a helpful section on the management of hæmoptysis. The wise instruction is given that, "in every case of hæmoptysis, unless some other very obvious cause is found, pulmonary tuberculosis should be suspected." Pathological conditions producing pulmonary hæmorrhage are described in a manner likely to be helpful to the clinician, and the guidance in regard to differential diagnosis is reliable. The directions for treatment of hæmoptysis are thoroughly serviceable. Absolute physical and mental rest is given the foremost place. The author's instructions to his patient are thus summarized: "(1) To maintain absolute rest in a semi-recumbent position; the passing of stools and urine should be carried out with the assistance of a bedpan and bottle; the patient should not have his bed made during the first days. (2) All talking should be avoided; the patient should limit his communications to his environment, to the most necessary remarks, and these should be written on a slate. (3) As to food, only a little cold liquid diet, or, better still, none at all, should be taken during the first days; the thirst may be overcome by pellets of ice. (4) The patient should restrain his cough as much as possible, and expel the blood that may still be flowing with as little effort as possible. (5) I also tell him that he need not be anxious, even when the hæmorrhage is severe, since fatal hæmorrhages are exceptional." It is also pointed out that in the management of hæmoptysis cases the following points must be aimed at: "(1) To palliate the cough as much as possible in order that unnecessary movements of the chest may not expel the thrombus from the injured vessel. (2) The thorax should be kept as quiet as possible. (3) To favour the formation of the thrombus." Many practical suggestions are given regarding drugs and therapeutic measures. It may also be noted that there is a suggestive section on

[1] "Emergencies in Medical Practice. The Pathology and Treatment of Morbid Conditions that may suddenly endanger Life." By Dr. Richard Lenzmann, of Duisberg. Translated from the third edition by Ronald E. S. Krohn, M.D. Lond. 1 p. 577. London: John Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, Oxford Street, W. 1915. Price 21s. net.

pneumothorax. The whole work has been well planned and wisely carried through. The translator has accomplished his responsible task with considerable success. Finally, a word of praise is due to the publishers, who have produced the volume in a worthy form; the type is excellent, and the general get-up is such as will add to their rapidly increasing reputation as medical publishers.

THE ANTI-FLY CAMPAIGN.

Much reliable evidence has been accumulated to show that the common house-fly more than the blue-bottle or any other allied species plays an important part as a carrier of disease-producing agents. Major Hurlstone Hardy has prepared a small manual which admirably summarizes the main results of scientific researches in a form which can be readily understood by any reasonable reader.[1] It is just the book which, put into the hands of patients, will enable them to co-operate intelligently in the anti-fly campaign. Good descriptions are given of the house-fly and other flies met with in association with human habitations. An excellent figure is provided of the wing patterns of the blue-bottle, the house-fly, the lesser house-fly, and the stable-fly, and directions for the ready identification of various forms of British flies of economic importance liable to infest man's dwellings. A chapter is devoted to a concise account of the general life-history of the fly, and this is followed by a description of its structure. The myiasic infection of cattle and of human beings is also fully explained. The book, however, is thoroughly practical, providing directions for the conduct of preventive and remedial measures, and affording much sensible advice regarding means for control within the house. The most valuable sections of the volume are to be found in the Appendix, which contains an index of terms and symbols and an excellent reproduction of the Wingate Fly Chart, together with a series of excellent plates illustrating family type-forms of antennæ, wings, and the like. Doctors, sanitarians, and all practical workers in the cause of public and personal health, will do well to study this short but most sensible and helpful monograph.

Reference may here be made to an informing illustrated booklet which has been issued by Dr. E. W. Hope, of Liverpool, on "Flies and their Dangers."[2] It will serve as an excellent model for other public health authorities to imitate.

MANUALS FOR MEDICAL PRACTITIONERS, AND WORKS OF REFERENCE.

Messrs. John Wright and Sons, Ltd., of Bristol, have not only won well-deserved distinction by the issue of their "Medical Annual," but by providing volumes specially designed to meet the requirements of busy practitioners. We have received copies of two of these publications, which we desire to commend specially to the notice of all

[1] "The Book of the Fly: A Nature Study of the House-Fly and its Kin; The Fly Plague and a Cure." By G. Hurlstone Hardy. With an Introduction by Halford Ross. Pp. viii+124. With 7 plates and 6 figures. London: William Heinemann, 2, Bedford Street, W.C. 1915. Price 2s. 6d. net.

[2] City of Liverpool—Memorandum of the Medical Officer of Health: Flies and their Dangers. Pp. 7, with illustration. Liverpool: Municipal Buildings, Dale Street. 1915.

responsible for the management of patients both in hospital and private practice. The works are eminently suited to the needs of the young practitioner. The first volume is the admirable "Index of Treatment," edited by Dr. Robert Hutchison and Mr. James Sherren.[1] It was first issued in 1907, and is now in its seventh edition. The present issue has been thoroughly revised and brought up to date. Parts have been rewritten and fresh sections have been added, and amongst them are new articles on Sterility, Radium-Therapy, and the Psychoneuroses. There are no less than eighty-nine contributors, well over a thousand pages of close letterpress, eighty-two illustrations, and a thoroughly effective index. The work fully maintains its primary aim to provide the practitioner with a complete guide to treatment "in moderate compass, and in a form convenient for reference." The names of those responsible for the volume and for the various articles are sufficient guarantee of the excellence and general reliability of the work. The book is a trustworthy guide to the best and most modern methods of dealing with disease. Care has been taken to avoid unnecessary padding or an embarrassment from the presentation of a large choice of procedures. Only such are described as in the opinion of the respective writers are to be considered as serviceable. The various forms of tuberculosis are described. Pulmonary tuberculosis is admirably dealt with by Sir Robert W. Philip, and measures for treatment are indicated under the three heads: (1) To increase the natural resistance of the tissues; (2) to oppose the tubercle bacillus more directly; (3) to meet symptoms and complications. Tuberculous Disease of Bone is described by Mr. V. Warren Low, and the article on Tuberculous Disease of Joints was written by the late Mr. Edmund Owen. Mr. W. H. Clayton-Greene is responsible for the section on Tuberculous Glands, and Mr. J. W. Thomson Walker treats of Tuberculous Epididymitis. Dr. Robert Hutchison contributes a short section on Tuberculous Peritonitis, and Mr. H. Lambert Lack writes a good account of Tuberculosis of the Larynx. The whole book, in its alphabetical arrangement, wise use of differentiating types, clear printing, excellent paper, and general excellence of articles, is a model reference-book for practitioners.

Dr. A. Rendle Short has edited a work on Prognosis and End-Results of Treatment[2] which forms a particularly valuable companion volume to the "Index of Treatment" of Dr. Hutchison and Mr. Sherren. The editor indicates the aims of the volume as—(1) To set forth the results, and particularly the end-results, of various methods of treatment, in such a form as will enable the practitioner to obtain a fair, unbiassed, reasoned opinion as to the prospects of securing for his patient permanent relief, and the rules of such treatment. (2) To

[1] "An Index of Treatment, by Various Writers." Edited by Robert Hutchison, M.D., F.R.C.P., Physician to the London Hospital, and Physician (with charge of out-patients) to the Hospital for Sick Children, Great Ormond Street; and James Sherren, F.R.C.S., Surgeon to the London Hospital, and Senior Surgeon to the Poplar Hospital for Accidents. Seventh edition, revised and enlarged. Pp. xvi + 1143. Bristol: John Wright and Sons, Ltd. 1915. Price 21s. net.

[2] "An Index of Prognosis and End-Results, of Treatment, by Various Writers." Edited by A. Rendle Short, M.D., B.S., B.Sc, F.R.C.S.; Captain R.A.M.C.; Hunterian Professor, Royal College of Surgeons; Hon. Assistant-Surgeon, Bristol Royal Infirmary; Lecturer on Physiology, University of Bristol. Pp. viii + 570. Bristol: John Wright and Sons, Ltd. 1915. Price 21s. net.

furnish data by means of which, apart from the question of treatment, one may seek to arrive at an accurate forecast of what will probably happen to the individual patient. The aims are ambitious, and it is clear that many difficulties have had to be overcome, but the volume before us affords abundant evidence of the success of the endeavour. Dr. Rendle Short has been fortunate in his coadjutors. There are twenty-four contributors, and each has done his share to make the book uniform in aim and accomplishment, and a practical contribution to the library of the practitioner. The section dealing with Pulmonary Tuberculosis and Diseases of the Lungs and Pleura has been prepared by Dr. Arthur Latham. The factors influencing prognosis are clearly indicated, and statistics are given which seem to throw some light on the varying results of sanatorium management, and treatment by tuberculin in different classes of cases. Mr. A. J. M. Wright is responsible for the section on Tuberculosis of the Larynx. The editor contributes the articles on Tuberculosis of the Cæcum, Tuberculous Enteritis, Tuberculous Epididymitis, Tuberculous Arthritis, Tuberculous Lymphadenitis, and Tuberculous Peritonitis. The volume claims to be unique, and it certainly marks a distinct advance in our knowledge of the end-results of disease and the consequent treatment for the same. The handling of statistics is always difficult, and the deductions drawn are apt to be misleading, but this volume certainly affords much new matter, and connotes old data in a way which cannot but prove of considerable service to the medical adviser.

The yearly volumes of "The Medical Annual" are to be found on almost every practitioner's bookshelf, and it is evidently, in most cases, one of the most consulted of volumes. But the years slide by so rapidly, and the progress of medicine is so unceasing, that practical measures have to be taken to render information available. The issue of a new volume of the "Synoptical Index to the Medical Annual" will be welcomed by many.[1] It deals with the issues for the years 1905 to 1914 inclusive. For all possessing "The Medical Annual" for the past ten years, this Index will be invaluable. The general arrangement is, of course, alphabetical. An exact reference is given to the original communication. Oftentimes the reference required is some special formula or note on a new drug or direction for treatment, and this is given in the index, so that no further searching is needed. The volume also contains a List of Drugs, giving the doses in Imperial and Metric measure, in accordance with the 1914 issue of the British Pharmacopœia. There is also a helpful article on the Metric Method of Prescribing.

The Henry Phipps Institute has issued a valuable monograph on "Pulmonary Acoustic Phenomena," by Drs. C. M. Montgomery and E. A. Eckhardt, which merits the careful study of all clinicians interested in the scientific study of auscultatory examination of the chest.[2]

[1] "The Medical Annual Synoptical Index. To Remedies and Diseases. For the Ten Years 1905 to 1914." Pp. xi+407. Bristol: John Wright and Sons, Ltd. 1915. Price 8s. 6d. net.

[2] University of Pennsylvania: Tenth Report of the Henry Phipps Institute for the Study, Treatment, and Prevention, of Tuberculosis. Pulmonary Acoustic Phenomena. By C. M. Montgomery, M.D., of the Henry Phipps Institute, and E. A. Eckhardt, Ph.D., Department of Physics, University of Pennsylvania. Pp. 117. Published by the Henry Phipps Institute, Seventh and Lombard Streets, Philadelphia, U.S.A. 1915.

The Supplement to the Forty-third Annual Report of the Local Government Board[1] contains the Medical Officers' Report, with data and diagrams regarding the death-rate from tuberculosis in different parts of the country. The volume contains the Memorandum and Plans prepared by Dr. Newsholme and Mr. Brook Kitchin regarding provision of new residential institutions for the treatment of pulmonary tuberculosis. The tables of tuberculosis statistics will also be found of service for reference.

The National Clean Milk Society, which exists "to raise the hygienic standard of milk and milk products, and to educate the public as to the importance of a clean and wholesome milk-supply," has issued a pamphlet explaining the Score Card System of Dairy Farm Inspection, which has proved so serviceable in the United States of America.[2]

Messrs. Tuke and Bell, Ltd., have issued an artistic, well-illustrated and helpful manual on "Country House Hygiene," dealing specially with theories and practice of water-supply, water purification, and sewage treatment.[3]

Mr. Walter Hill has recently issued the twentieth edition of his "Where to Stay and What to See," which forms a valuable guide to Health and Holiday Resorts served by the chief railway systems.[4]

Sir George Newman, in his last report as Chief Medical Officer of the Board of Education, has special sections on "Tuberculosis in School Children," and "Open-Air Education."[5]

[1] Forty-third Annual Report of the Local Government Board, 1913-14. Supplement containing the Report of the Medical Officer. (Cd. 7,612.) Pp. cxxiv + 237. London: Wyman and Sons, Ltd., 29, Bream's Buildings, Fetter Lane, E.C. 1914. Price 1s. 11d.

[2] "The Score Card System of Dairy Farm Inspection." Published by the National Clean Milk Society, 2, Soho Square, London. Price 6d.

[3] "Country House Hygiene." A booklet prepared by Messrs. James E. Tuke, Charles W. Bell, E. M. Robson, E. R. Boothby, and C. R. B. Brown, for Messrs. Tuke and Bell, Ltd., specialists in water and sewage engineering, Carlton Engineering Works, High Road, Tottenham, London, N.

[4] "Where to Stay and What to See, being a guide to Hotels, Boarding Houses, Apartments, Furnished Houses to Let, House and Estate Agents, Furniture Removers, and Principal Business Houses in Seaside and Country Health and Holiday Resorts; also Educational Facilities in the Districts served by the Midland, London and North-Western, Great Northern, Great Eastern, Great Western, and Great Central Railways, together with useful and interesting information for the Artist, Antiquary, Angler, Tourist, and Holiday Maker." London: Walter Hill, 67-71, Southampton Row, W.C. 1915. Price 1s.

[5] Annual Report for 1914 of the Chief Medical Officer of the Board of Education. [Cd. 8,055.] Pp. viii + 309. London: Wyman and Sons, Ltd., 29, Bream's Buildings, Fetter Lane, E.C. 1915. Price 1s. 3d.

PREPARATIONS AND APPLIANCES.

THE NEW SINGER STETHOSCOPE.

In the April issue of this journal we drew attention to a new form of binaural stethoscope introduced by Dr. J. J. Singer, of the Washington University Hospital, St. Louis, and manufactured by the A. S. Aloe Co. of St. Louis, Missouri, U.S.A. Through the courtesy of the inventor and the makers we have had an opportunity of testing an improved form of the Singer Stethoscope.[1] The appliance consists of three resonators of different sizes, each made of metal of definite density and resonance. Each can be attached separately to the curved hollow **Y**-shaped tube which serves as a handle and connecting portion with the rubber conducting tubes which lead to the ear-pieces. The resonators are so constructed as to allow of their being nested and held in place by a cap member, thus allowing for the compact and convenient carriage of the instrument in the pocket. The accompanying block indicates the apparatus as a whole, together with pocke case. It also shows how the resonators are nested and attached to the combined **Y**-tube and ear-pieces. Each resonator is cup-shaped with a flat-top wall, and has an opening of the same size in each for the attachment of the connecting tube. The cap member is a flat disc with spring fingers overlapping the rim of the largest resonator, so holding all in a compact case. It is contended that when the lower edge of the resonator is placed in contact with the patient's chest, the air entrapped is set in movement by the vibrations of the chest wall which in turn is taken up the resonator itself in unison with the vibrations of the chest wall. The inventor states that his stethoscope

THE SINGER STETHOSCOPE.

[1] The New Singer Stethoscope is manufactured exclusively by the A. S. Aloe Company, Aloe Building, 513, Olive Street, St. Louis, Missouri, U.S.A. Price, complete, in felt case, $3.50.

intensifies sounds without changing their character. Adventitious friction sounds are largely eliminated, as only the side walls of the resonators are in contact with the patient's body, and the top wall acts as a sounding-board. Whatever may be the precise principle on which the stethoscope works, it certainly is a particularly valuable instrument for clinical work. It offers many advantages. It possesses no breakable diaphragm, and instead of having several parts, each resonator is an instrument in itself. The appliance is durable, and can be cleansed and sterilized without danger of injury. It may also be noted that the ear-pieces are of aluminium, and can be removed for cleaning—a great advantage over the ordinary and readily broken ivory ear-pieces. We have subjected Dr. Singer's stethoscope to considerable testing, and would strongly recommend it to clinicians who desire a simple, effective, convenient, and durable form of stethoscope for all classes of cases requiring auscultatory examination.

PROTECTION FROM FLIES.

Much attention has recently been directed to the danger of flies acting as the carriers of disease. This is no imaginary peril, but one which is very real in this and other lands. Flies readily congregate about vessels containing tuberculous sputum and other morbid secretions, and they have been proved to be capable of conveying tubercle bacilli from infected material to milk and other forms of food. Many measures have been devised for dealing with flies of various varieties, and amongst them chemical agents, when suitably employed, have been shown to be of considerable service.

Messrs. Heppell and Co. have introduced an excellent form of ANTI-FLY SPRAY.[1] It is a non-poisonous solution of insecticides combined in a convenient and effective form. Each small bottle is provided with a powerful spray which enables the liquid to be distributed over areas where flies congregate, and permits of penetration into corners and crevices. The spray may be used on carpets, curtains, and other fabrics, or distributed over dustbins and other conveniences where flies are wont to gather. This spray should prove of much service in hospitals and sanatoria. It is being largely used by members of the British Expeditionary Forces.

In sanatoria, open-air schools, and indeed often in connection with open-air procedures connected with ordinary life, the presence of flies and gnats and insect invaders lead to much inconvenience and sometimes to actual suffering. It is now well recognized that flies are often the carriers of disease. Certainly all responsible for the hygienic management of consumptives are justified in becoming active members in the anti-fly campaign. Messrs. Kay Brothers, Limited, of Stockport, have provided an excellent series of weapons.[2] Their Fly-Papers are available to various forms and sizes, and bear striking, but appropriate names. They only require to be used to demonstrate their

[1] Full particulars of Heppell's "Anti-Fly Spray" may be obtained on application to the manufacturers, Messrs. Heppell and Co., 73, Knightsbridge, London, S.W. The sample form of solution, with sprayer, costs 3s. 6d. complete, but the best results are obtainable with the larger sprayer, which holds over a pint, and reaches several yards.

[2] Full particulars regarding various forms of hygienic and sanitary preparations may be obtained on application to Messrs. Kay Brothers, Ltd., St. Petersgate Mills, Stockport.

effectiveness. This firm also supplies reliable forms of Birdlime for catching birds, rats, mice, beetles, etc. We would also recommend their "Tonnolite" Soap, which is an excellent preparation for cleansing painted, varnished, and plain surfaces of wood, glass, stone, pottery, metal, linoleum, carpets, etc. It will also be found effective in washing clothes, and may be employed for the washing of horses and dogs. It should be popular in sanatoria and hospitals.

Attention may here be directed to the very simple but effective FLIPPER FLY FLAPPER, which has justly become popular as a weapon in the destruction of flies.[1] It consists of a thin, small-meshed wire gauze, attached to a wooden handle, but allowing for free vibration. A sudden onslaught with this little instrument usually succeeds in destroying house flies on the wing.

A NEW OPEN-AIR SHELTER.

Many forms of shelter have been introduced for the use of tuberculous subjects undergoing open-air treatment, but one which has been constructed by Mr. W. T. Revitt for the Public Health Committee of the Northampton Corporation and the Northamptonshire County Council, and other private and public bodies, merits consideration. Its general form is indicated in the accompanying illustration. It is 7 by 5 feet, 8 feet high in front, and 6 feet high at the back. It is made in sections that can be carried through a house into the back garden. It is covered outside with $\frac{3}{4}$-inch tongued and grooved boards. The flooring is of tongued and grooved boarding fixed on strong joists. The roof is covered with "permanite" felting. The front canopy projects for about 30 inches, and consists of $\frac{5}{4}$-inch boards fixed $\frac{3}{8}$ inch apart, leaving space between the boards for entry of air. The canopy is hinged to the main roof, and can be folded back if desired. The sides and front of the shelter

THE IDEAL TUBERCULOSIS SHELTER.

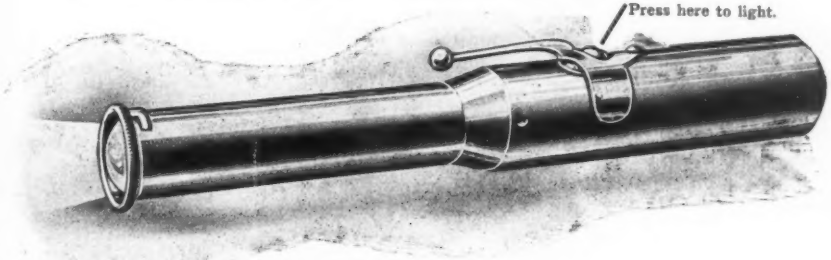
are fitted with sliding frames covered with "Willesden" canvas. The ventilator extends the whole length of the shelter. The door has canvas top panels, and is fitted with latch and lift-off hinges. All the woodwork has been treated with preservative, and, if desired, the inside

[1] The Flipper Fly Flapper is manufactured by Messrs. Hoods, Ltd., International Exchange, Edmund Street, Birmingham.

can be varnished. "THE IDEAL TUBERCULOSIS SHELTER" has been designed and constructed to prove a durable, comfortable, compact, effective, and inexpensive shelter for patients undergoing "domiciliary treatment." Tuberculosis officers will do well to test this new form of "home cure" shelter.[1]

A POCKET ELECTRIC TORCH.

A particularly compact and serviceable electric torch, suitable for service in sanatoria and hospitals, and such as will be valued by doctors and patients alike, has been introduced under the designation of



THE "PENLITE" FOUNTAIN PEN FLASH LIGHT.

"PENLITE," or the "Fountain Pen Flash Light."[2] Its essential features are fully illustrated in the accompanying figures. The neat and novel form will make "Penlite" popular with medical practitioners. Its size is $5\frac{1}{2}$ by $\frac{5}{8}$ inches, and the weight is 2 ounces, and it is nickel-plated. It forms a suitable companion for the Fountain Pen, which now has a place in almost every doctor's vest pocket. It is said to give light for one and a half hours, and refils can readily be obtained. This novelty will be a suitable souvenir for our friends on active service.

A SANITARY SOAP SAVER.

In hospital and sanatoria much wisdom is necessary in providing for the proper equipment of lavatories and other places where patients and others wash. It is most desirable to take precautions against all forms of infection, and at the same time to stop unnecessary waste. An excellent appliance has been introduced under the name of the

[1] The Ideal Tuberculosis Shelter is manufactured by Mr. W. T. Revitt, of Olney, Bucks. The price is £7 10s., delivered free on rail at Olney, or carriage paid in lots of six upwards.

[2] The "Penlite" is supplied by Messrs. Haylock and Haslett, 63, Queen Victoria Street, London, E.C. Price 3s. 9d., and refils cost 1s. each.

"'K AND W' SOAP SAVER," which meets both of these points.[1] The main features of this ingenious and practical contrivance are indicated in

THE "K AND W" SOAP SAVER.

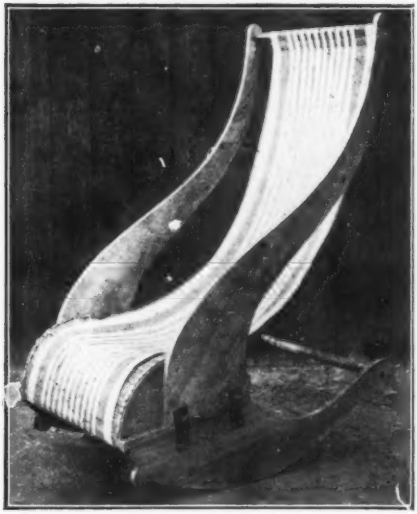
the annexed illustration. It is based on the principle of the glass bird fountain, and consists of a one-piece earthenware container, having a lip in front from which the user can extract just sufficient soap as is required for use. There are no separate working parts, and no portions are liable to get out of order. The Saver can be obtained in two sizes—one holding a gallon of soap solution and the other half a gallon. The "K and W" Antiseptic Liquid Soap for use with the Saver can be obtained at quite reasonable rates.

A SANATORIUM ROCKING-CHAIR.

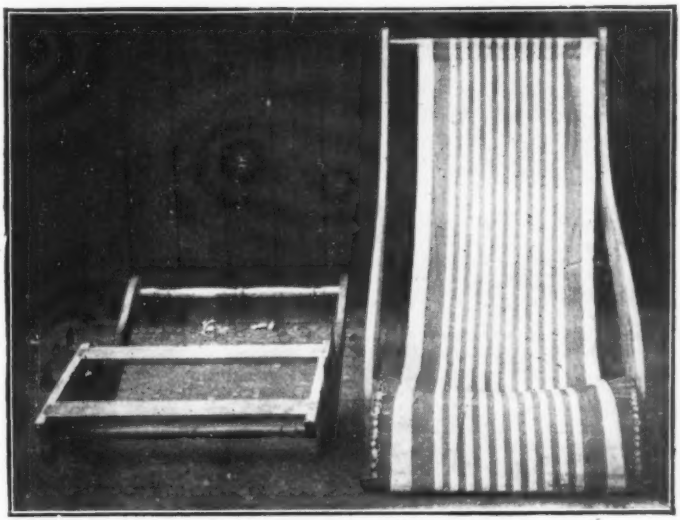
Through the courtesy of Dr. R. C. Brown, of Preston, we are enabled to give illustrations of a new and highly novel form of SANATORIUM ROCKING-CHAIR.[2] This chair has been designed by Dr. Brown,

[1] The "K and W" Soap Saver is supplied by the "K and W" Soap Saver Company, 8, Bream's Buildings, London, E.C. Prices 15s. and 20s. The "K and W" Antiseptic Liquid Soap costs 13s. 6d. for a 9-gallon cask.

[2] The price of Dr. Brown's Chair is £2, and of this 10s. will be given to some of the funds which are being raised for the relief of sick and wounded soldiers and sailors. The chair is being made by Messrs. John Cartmell and Sons, Ltd., Albion Mills, Preston. One of the Chairs can be seen at the Royal Infirmary, Preston; at the Voluntary Aid Hospital, Moor Park, Preston; at the Sanatorium of the National Children's Home and Orphanage, Harpenden, Herts; at the Military Hospital, Alder Hay, Liverpool; at the Fazackerley Hospital, Liverpool; and at Lord Derby's Hospital, Winwick, near Warrington. Full particulars may be obtained on application to the inventor, R. C. Brown, M.A., M.B., F.R.C.P., F.R.C.S., 27, Winckley Square, Preston, Lancashire.



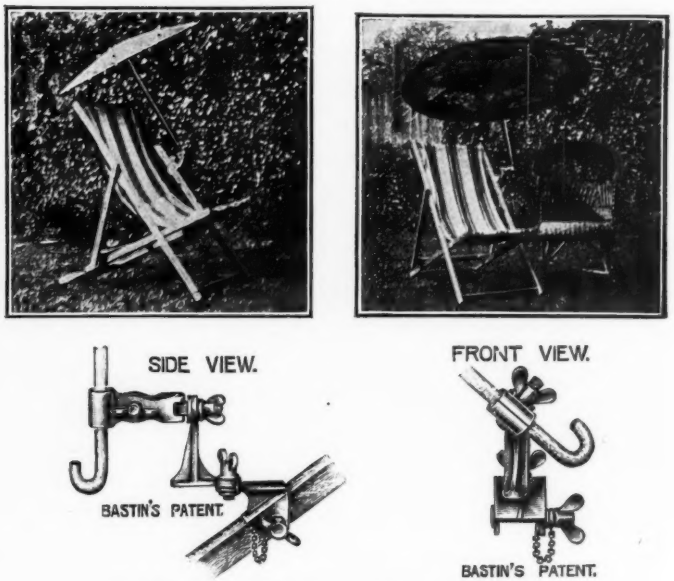
THE DR. R. C. BROWN SANATORIUM ROCKING-CHAIR.



THE DR. R. C. BROWN SANATORIUM CHAIR, USED AS A RESTING COUCH.

who claims for it the following special points: (1) Whether used in its combined form as a chair, or in its separated form as a bed-rest, the canvas supports the back from the head to the hips, and affords a remarkable amount of comfort. (2) When used as a bed-rest, the raised portion at the lower end prevents the patient from slipping down in the lower part of the bed; this is an advantage which is wanting in the ordinary form of bed-rest. (3) In its combined form, the chair can be taken out of doors, and if the legs of the patient are raised on to an ordinary chair or stool, a degree of comfort is obtained which a personal experience will clearly demonstrate. (4) By having such an arrangement as is adopted for the purpose of rolling or unrolling an ordinary window-blind, the canvas can be either lengthened or shortened, as may be required, according to the height and weight of the patient. (5) As the appliance has been designed for the relief of sick and wounded soldiers and sailors, any profit arising from the sale of it will be given to some of the funds which are being raised for their benefit. (6) The chair will be found equally useful either in the bedroom, sitting-room, or garden.

REQUISITES FOR THE SANATORIUM AND THE TUBERCULOSIS PATIENT.



THE "ADJUSTA" PATENT SUNSHADE HOLDER.

As the nature of tuberculosis and the needs of the tuberculous patient become better understood, inventiveness and scientifically directed skill are being directed to the designing and construction of various

appliances for the sanatorium and preparations for the patient, all of which tend to improve the conduct of open-air methods, and make hygienic and therapeutic management more effective.

In arranging for rest in the open, it is not only necessary to provide the patient with a comfortable lounge or chair, but care must be taken to secure adequate shelter from wind, rain, and oftentimes the too direct rays of the sun. Messrs. F. Bastin and Co., the well-known firm of engineers, have introduced a novel, cheap, but very satisfactory appliance for the fixing of a sunshade or umbrella above a resting patient. The accompanying figures make description almost unnecessary. The "ADJUSTA" PATENT SUNSHADE HOLDER[1] is designed for attachment to outdoor garden chairs and seats, the back of rowing-qoats and punts, Bath chairs, spinal carriages, and the like. The holder is clamped on the sloping arm or to the back of the chair by a thumb-screw. The sunshade is fixed in the jaws of the holder, and kept in any desired position by screwing up a wing-nut. The holder is made of malleable iron, with black finish or covered with aluminium paint, which prevents rusting. We strongly recommend this ingenious holder for all who follow open-air methods of life.

The accompanying illustration shows the chief features of a new form of STERILIZER FOR SPUTUM CUPS.[2] It is made of copper, and with steam tubes and connections is tinned inside. There are four galvanized iron-wire trays, capable of holding about thirty cups in each tray. Steam admitted through the tubes boils the water in a few minutes. The contaminated water can be drawn off through the tap at the bottom and allowed to escape into the drain. The sterilizer is 30 inches long by 24 by 25 inches back to front, and the legs are about 9 inches high. The sterilizer has been specially designed for use in sanatoria, and it is now employed by the Health Department of the Corporation of Birmingham.

A STERILIZER FOR SPUTUM CUPS

[1] The "Adjusta" Patent Sunshade Holder is manufactured by Messrs. F. Bastin and Co., 97, Queen Victoria Street, London, E.C. Price 3s. 6d.; postage, 3d.

[2] The new Copper Sterilizer for Sterilizing Sputum Cups is manufactured by Messrs. Matthew J. Hart and Sons, Great Barr Street, Little Barr Street, and Palmer Street, Birmingham. Price £11 2s. 6d. Special cups for use with the sterilizer are supplied at 1s. 6d. and 1s. 9d. each.

NOTES.

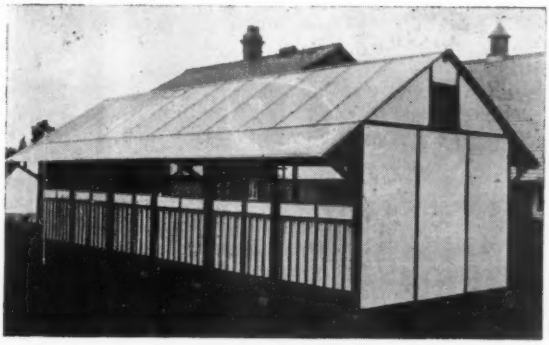
EDITORIAL.

THE BRITISH JOURNAL OF TUBERCULOSIS with this issue completes its ninth year. It is not without interest to consider the aims and views set forth in the first number of this journal, which bears the date of January, 1907. A brief quotation from the Editorial may be permitted here: "The tuberculosis problem is essentially a medico-sociological one. It is not merely a puzzle in pathology, but appeals to all sorts and conditions of men as a question of world-wide importance, touching the deepest interests of humanity. . . . The magnitude of the problem can scarcely be overrated. In almost all countries and among nearly every people the disease hinders and hampers national progress, and works incalculable domestic misery and individual suffering. Not only is State action imperative for the protection of each country, but international co-operation is essential if such comprehensive and scientifically directed policy is to be adopted as shall make for the extermination of this bane of humanity." During the past nine years, as the bound volumes of this journal abundantly prove, remarkable progress has been made in the establishment and maintenance of ways and means whereby an effective campaign against tuberculosis can be successfully waged. And now this and other conflicts against the enemies of human happiness and well-being are being rendered difficult by the prevalence of the Great Conflict in which we of necessity are engaged for the sake of man's highest principles and noblest purposes. The war has made tuberculosis work peculiarly perplexing and full of difficulties. No advantages can result from an enumeration of obstacles at the present moment, and criticism of organizations and administrators will hinder rather than help. The greatest service will be attained by a serious insistence on the maintenance of such efforts as are essential to the effectiveness of schemes necessary for the maintenance of national health. This journal seeks to aid all endeavours directed to the continuance of efficient agencies now engaged in anti-tuberculosis work, and it will be our chief aim to further all rational efforts directed to the extension of such constructive work as may be needed to secure the most serviceable assistance for tuberculous sufferers in all ranks of life. The next number of this journal will be the first issue of Vol. X., and in order that our future pages may contain only matter of a thoroughly practical character, and such as will be of real assistance to all engaged in tuberculosis work, we shall gladly welcome suggestions of every kind.

OPEN-AIR TREATMENT.

There is now no need to waste words explaining the advantages of open-air methods in the maintenance of health and for the restoration of the sick and injured. The experience of the past fourteen months

has made all this clear even to the most obtuse and unbelieving. The interesting experiment described by the Master of Christ's College, Cambridge, in the first article of the present issue of this journal clearly establishes the value of the application of open-air principles in the conduct of a military hospital. Dr. W. Ernest Nelson, the Medical Director of the Warwickshire Branch of the British Red Cross Society, has described a form of open-air ward built for use at the V.A.D. Hospital at Henley-in-Arden, of which he is Commandant and Medical Officer.[1] The ward has accommodation for eight beds. The chief features claimed for this form of building are: (1) It is open to the air on both sides, the ends only being closed in. Most open-air wards now

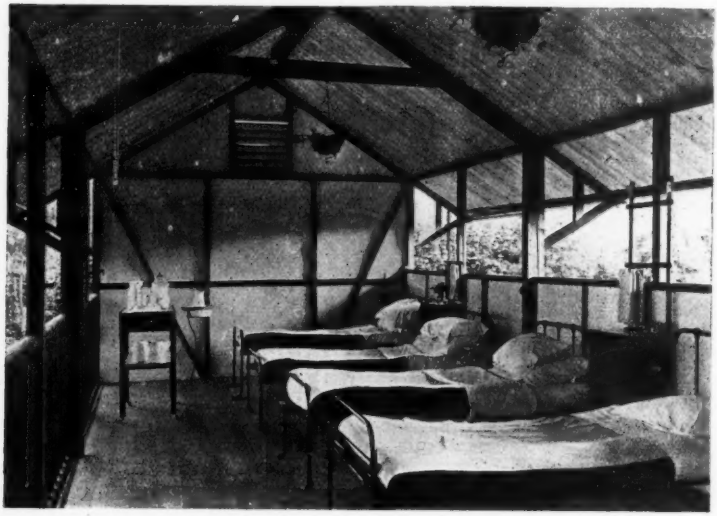


EXTERIOR OF OPEN-AIR WARD.

to be seen are closed in on three sides. The protecting screens, at the back of the bed-heads, seen on the right-hand side of the view of the interior, are 4 feet high, and afford ample protection from draught. The left-hand side is open down to the ground, except for an open balustrading. Thus there is a free current of air continually passing over the heads of the patients as they lie in bed, and yet they do not feel any draught. (2) The deep sloping eaves are set at such an angle that the rain cannot drive in, even on the most windy and rainy days. During the past month of July, in which we have not had a single day without rain, and have had some of the most severe thunderstorms ever experienced, the interior of this ward has always remained dry, and the patients have suffered no inconvenience from wind or rain. (3) If it is desired to close in one side completely, this is done by a system of spare screens, which either fit into grooves provided or are hinged on to the already existing screens at the back of the beds, and are then thrown upwards and bolted to the wall-plate or roof. In this way either side of the ward, or both, can be entirely or partially shut in. (4) It is easily built, the materials being wood and asbestos sheeting, the latter being cheaper than wood, besides having the

[1] The full description of this suggestive form of open-air ward appears in the *British Medical Journal* for August 28, 1915, p. 324, and through the courtesy of the Editors and Dr. Nelson we are permitted to reproduce the illustrations accompanying the article.

additional merit of being fireproof. The roof is of match-boarding, covered with rubberoid. The floor is constructed of boards, tongued and grooved, so that no draught can come through. The whole structure is raised some 12 inches from the ground on small brick pillars; this allows a free current of air under the building, and at the same time does not kill the grass, should it be found necessary to erect such a



INTERIOR OF OPEN-AIR WARD.

building on a lawn or in a field. (5) It is quickly and easily erected. This particular building was put up complete in four days—ten days from the date of the order being given. (6) It is easily connected with the main building of the hospital by a covered way, so that nurses and patients can pass to and fro in any weather. Dr. Nelson will be pleased to give further details to anyone interested in the subject, or these can be obtained direct from the architects, Messrs. Osborne, Pemberton, and White, 40, Bennett's Hill, Birmingham.

NATIONAL ASSOCIATION FOR THE PREVENTION OF CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

The annual report of the above association was submitted to the sixteenth annual general meeting of members on Thursday, July 15, 1915, at the headquarters of the association, 20, Hanover Square, W., the Right Hon. the Lord Balfour of Burleigh, K.T., presiding. Professor Denys of Louvain delivered an address on tuberculosis and tuberculosis work. The association was obliged to forego its annual conference this year on account of the war and the number of lay and

medical supporters called to the colours. The Council's report explains that the record presented in their report for last year was one of exceptional activity and appreciation of the association's work, and the Council looked forward to a not less prosperous future. At that time the programme for the caravan tours was full for the ensuing six months, including visits to the Midlothian district, Buckinghamshire, Hertfordshire, Gloucestershire (Stonehouse district), and Kent. The after-care propaganda was being vigorously and successfully pushed, while the conditions created by the National Health Insurance Act were providing extensions for the association's work in many directions. The advice of the association was being sought by many of the new bodies in the organization of their educational campaigns, and there was a growing demand for the services of the lecturers; while, thanks to the support of the Approved Societies and their appreciation of all efforts, new openings for visits of the Tuberculosis Exhibition were being made in many quarters in the industrial cities of the North. The report proceeds to explain that unfortunately this promise has not been entirely fulfilled; the association, in common with other philanthropic societies, has suffered from the war, in consequence of which anti-tuberculosis work in many directions has been curtailed. In spite, however, of the difficulties occasioned by the present crisis, the association is doing its best to maintain its interests, and the wider schemes are in abeyance only. It is interesting to note that the war has provided a striking illustration both of the need for anti-tuberculosis work and of its fruits. On the one hand, the excessive fatigues of campaigning and the conditions of naval life have led among the weakly to a spread of the disease in men with incipient and latent proclivities, for whom treatment must be provided, and who in the future will add to the sources of infection. But on the other side there is a brighter picture—numerous instances of men who have passed through our sanatoria being able to take their place in the fighting line, and proving the efficacy of their treatment by facing these arduous duties successfully. Taking one instance only—Leeds—forty-seven of the men who have been successfully treated in their sanatorium are now serving with the colours. Eight are with the Expeditionary Force, and the remainder in training. This is sufficient evidence to show that, once consumptive patients are removed from the environment which created the disease, and are properly cared for, they have a good chance of recovery, and of becoming useful members of the community. Moreover, the advantages of the open-air life which have so persistently been preached by the association from its foundation have received a gratifying testimonial from the great improvement in the physique of the new armies which has been brought about by their heavy open-air work and physical drill. This is but the principle of treatment of the open-air life and graduated exercise adopted in our sanatoria. Would that this beneficial system were extended to the whole nation, not only during war, but in time of peace! Viewed in this light the war is not without its advantages, and must exercise a marked influence on the physique and habits of the nation. The Council has to regret the death of Lord Justice Kennedy, and the resignation of Sir James Kingston Fowler, K.C.V.O., M.D. To the vacancies thus caused, the Right Hon. Charles Hobhouse, M.P., and Dr. F. N. K. Menzies, have been appointed.

THE QUEEN ALEXANDRA SANATORIUM, DAVOS.

The object of this institution is mainly to secure the advantages of sanatorium treatment in an alpine climate for persons of small means, belonging to the English-speaking nationalities, who are suffering from curable tuberculosis, but who are unable to afford the ordinary expenses of such treatment. The recently issued annual report of the Council covers the period from April 1, 1914, to March 31, 1915, and includes separate reports from the board of management at Davos and of the medical superintendent. The following quotation is of interest: "The first four months were normal, and the prospects of the institution never seemed brighter. At the annual general meeting held on July 24, 1914, it was decided to complete the last unfinished items of the building, and orders for the work were given. There seemed every reason to suppose that the sanatorium was going to enjoy a more useful year than ever before. Then the European storm burst, and its effects upon the fortunes of the sanatorium and its inmates appear in the following pages. The action of the staff at Davos during the crisis deserves high praise. The Council deeply regret the necessity which has arisen for the temporary interruption of the ordinary work of the sanatorium, and also that at the present moment it does not appear possible for the British authorities to accept the Council's offer of the finely equipped building for hospital purposes. The financial effect of the war upon the sanatorium has been of course deplorable. A direct loss of several hundred pounds has already been incurred, which the institution can ill afford; moreover, owing to the closing of the sanatorium, the Council were obliged to refuse a proffered grant of £300 from the Medical Research Committee of the National Health Insurance." Dr. H. H. Carleton's report as medical superintendent contains the following: "The pressure of the war has been felt in no small degree at the Queen Alexandra Sanatorium, bringing grave responsibility on those who have the interests of the institution at heart. On the outbreak of hostilities many people were anxious to return to England; and, in view of the uncertainty of the future, it was deemed advisable to encourage patients, whose health permitted, to undertake the journey, when an opportunity was afforded by the Government. At the end of August only those patients were left behind who were either unfit to travel or who preferred to assume responsibility for themselves and remain in Switzerland. This small party included a number of serious cases, whose presence meant continuous anxiety for the medical staff throughout the ensuing winter. With the onset of winter, numbers being small—some twenty persons—it was decided to close the sanatorium, mainly on account of the prohibitive cost of heating. The patients were transferred to an hotel, where they continued to receive free medical attendance and nursing. It is to be hoped that the sanatorium will be opened again and fill up, ere long. The hardships of the war must bring a large amount of pulmonary tuberculosis in its train, and at the end of the war the institution will probably find itself in great request. The number of patients discharged during the last twelve months was 94—59 men and 35 women; 63 single and 31 married."

TUBERCULOSIS APHORISMS.

Dr. Lawrason Brown, of Saranac Lake, has published a series of aphorisms[1] which are so suggestive and helpful that we venture to reproduce them here: "(1) An appearance of ruddy health does not exclude tuberculosis. (2) In any patient with constitutional symptoms, no matter of what he complains, the possibility of tuberculosis must be kept constantly in mind. (3) Prolonged and intimate exposure at any time of life, but especially in childhood, and in home or workshop or office, is vastly more important in diagnosis than 'unassociated' or 'non-contact' heredity. (4) Prolonged contact with tuberculosis may lead to infection, but debilitating conditions are necessary usually to cause this to develop into clinical tuberculosis. (5) Constitutional or general symptoms lead us to a diagnosis of tuberculosis, while the localizing symptoms point out the organs involved. (6) The history or presence of certain complications, as fistula-in-ano, pleurisy, dry or especially with effusion, adenitis, a discharging ear, coming on painlessly, are all strongly suggestive of tuberculosis. (7) Loss of colour, prolonged exposure to tuberculous infection, especially in childhood, with a history of swollen glands at that time, the more recent subjection to debilitating conditions, the presence of unequivocal constitutional and localizing symptoms, with or without the aforementioned complications, demand a diagnosis of pulmonary tuberculosis even though no abnormal physical signs are present in the lungs. (8) *Your* patients, *your* friends, *your* family, are as prone to contact and develop pulmonary tuberculosis as hundreds of others. (9) The importance of physical examination in the diagnosis of pulmonary tuberculosis has been over-emphasized. (10) Symptoms are a better and more accurate guide to activity than physical signs. (11) Symptoms without physical signs demand treatment, while physical signs without symptoms require only careful watching. (12) Slight but persistent rise in temperature and increase in rapidity of pulse are often present early in the disease. (13) The usual weight of a patient who develops pulmonary tuberculosis is often 10 pounds below the normal weight for his height and age. (14) Failure to interpret rightly the significance of symptoms, to detect the presence of abnormal physical signs, can be condoned; but failure to ask for and examine the sputum repeatedly in any patient with chronic cough is inexcusable. (15) Absence of tubercle bacilli in the sputum means only that bronchial ulceration has not occurred. (16) Auscultation and inspection are the most important procedures in the detection of abnormal physical signs. (17) Inspection reveals localized retraction of the chest wall and limitations of the chest movement. (18) Auscultation is more important than inspection, and the detection of râles by the auscultation of the inspiration following cough is the most important procedure in the detection of physical signs of early pulmonary tuberculosis. (19) Changes in the relative lengths and intensity of the inspiration and expiration are valuable, but less easy to detect. (20) The disease is practically always more extensive than the physical signs indicate. (21) Abnormal physical signs in one apex should be considered as due to pulmonary tuberculosis until proved not to be, while those at the base should be looked on as non-

[1] "Diagnostic Theses in Pulmonary Tuberculosis." By Lawrason Brown, M.D. *Journal of the American Medical Association*, June 12, 1915.

tuberculous until definitely proved so. (22) The fluoroscope, the Röntgenogram, and stereoscopic plates, may reveal and locate pathologic pulmonary changes to be detected by no other means. (23) When sputum is lacking, or when tubercle bacilli are absent on repeated examinations, the possibility of the presence of bronchiectasis, hyperthyroidism, syphilis, and influenza, and more rarely pulmonary tumour and Hodgkin's disease, should be borne in mind. (24) No modification of the tuberculin tests as yet devised differentiates clearly clinical tuberculosis that demands vigorous treatment from non-clinical tuberculosis that requires only a God-fearing life. (25) It may be impossible to determine definitely the presence or absence of clinical tuberculosis."

TUBERCULOSIS IN EARLY LIFE.

To secure a permanent advance in the tuberculosis campaign, greater attention will have to be devoted to the protection of tuberculously disposed children and the care and control of young subjects of tuberculous disease. In a paper on "Tuberculosis in Childhood," by the Editor of this journal, which appeared in the *Polyclinic* for June, the question of tuberculosis in early life is discussed.[1] It may be permissible to make the following quotation: "Tuberculosis in infancy and childhood is now known to be of much more frequent occurrence than was formerly believed. Members of the medical profession, and particularly those in public health work, as well as non-medical workers in their social service, have all during the last few years awakened to the importance of recognizing tuberculosis in its beginnings, and much valuable effort has been expended in the searching out of predisposed subjects and of contact cases. This has been very evident, especially in connection with the work of the School Medical Service. The grants from the Board of Education and the Local Government Board in aid of the maintenance of tuberculous children have gone far to stimulate action in this matter. The recognition of tuberculosis in its initial stages is by no means easy. Few medical practitioners during student days have had any extensive clinical acquaintance with this class of case. Indeed, comparatively few of the newly appointed tuberculosis officers have enjoyed a large experience of the management of any considerable number of tuberculous and tuberculously disposed children under the hygienic conditions of sanatorium régime. The information to be derived from most books regarding the course and manifestations of tuberculosis in early life is for the most part based on out-of-date observations, made under old-fashioned hospital conditions, so that now, with modern methods of open-air management, such deductions prove in many respects to be imperfect or even actually misleading. Under the pressure of public opinion and of popular sentiment, and with widely differing views held by many medical advisers as to the phenomena which should be accepted as symptomatic of tuberculosis, it is hardly to be wondered at that many children should now be labelled tuberculous and recommended for sanatorium treatment, although in the view of experts there is no active tuberculosis present at all. Certainly every doubtful case should be given the advantage of hygienic measures; indeed,

[1] "Tuberculosis in Childhood." By T. N. Kelynack, M.D. *The Polyclinic*, vol. xix., No. 6, June, 1915. London: John Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, W.

open-air education is desirable for most children. Now that the extension of accommodation in sanatoria will be limited by the inevitable economic conditions incident to war, it seems the wisest course, in order to secure the greatest benefit for the greatest number, to bring hygienic principles and sanatorium methods into the home and into the school as far as possible. Moreover, it must be remembered that for most selected children sanatorium treatment is but a matter of weeks or months—at best but a fraction of the developmental period of the child's life. While children quickly respond to the hygienic life of a sanatorium, it seems quite possible that many when leaving with an arrest of disease, or at all events with quiescence of the tuberculous process, return home possessing diminished immunity. Certain it is that oftentimes cases which have done admirably in the sanatorium quickly flag and show evidence of recurrent trouble. Many parents, as well as numerous teachers, seem to think that the essential of sanatorium management for children is the continuous life in pure air, and this view appears to be generally encouraged by the majority of doctors. But of equal and perhaps even greater importance are the regulated routine of the child's day, the strict discipline of life, the insistence on hygienic precision in personal habits; the provision of regular, sufficient, and wisely selected and properly prepared food; the ordering of rest and exercise, sleep and play, and the like. When we are not able to bring our subnormal children into the ideal sanatorium, much could be done towards accomplishing the same ends if sanatorium methods could be brought into the home and ordinary school. Public health authorities, in view of the difficulties of the present situation, would do well to consider how far they can effectively bring the educative influence of their tuberculosis officers and the practical instruction service of their tuberculosis nurses into the very homes and schools where tuberculous and other delicate and sick children dwell. This plea and argument for increasing economy and simplicity and effectiveness might be readily enforced by the enumeration of many facts. . . . During the last few years attention has been directed to the prevalence of tuberculous involvement of the glands at the root of the lung, along the bronchi, and elsewhere within the thorax. That such glandular enlargement is common in children has been conclusively shown by Röntgenography. At the present time data are not available regarding the evidence of X-ray examinations of normal non-tuberculous children, and therefore we should be discreet and avoid the fashion now prevalent of diagnosing doubtful cases as hilus tuberculosis. Even when the glands are shown conclusively to be enlarged, and even when paroxysmal cough and pressure symptoms are present, we should hesitate before declaring that the glandular enlargement is of a tuberculous nature. And in this connection I should like to say that I believe that many of the glands marked on diagrams in report-forms as tuberculous, or probably tuberculous, are in many cases not due to tuberculosis at all. In a considerable number of instances glandular enlargements in the neck of 'strumous' children are due to streptococcal or other non-tuberculous infection from the throat, particularly through the lymphatic channels of the tonsils, or arising from the introduction of septic agents through the skin, the mucous membrane of the mouth and pharynx, or by way of decayed teeth. I should like in this place to enter one word of warning in regard to extensive

operations on tuberculous glands. Generally speaking, treatment should be as conservative as possible. Disfigurement must, of course, be avoided, and when softening occurs measures cannot be postponed. But too often the surgeon is encouraged to make a clean sweep of all doubtful glands, and frequently in doing so runs the risk of opening up vascular and lymphatic tracts, and sometimes, as we all know, the localized tuberculous material gains new ground and gives rise to subsequent local trouble, or even general involvement. The more one sees of the good results of conservative methods under sanatorium conditions, the more is one impressed with the permanent advantages secured by such natural restoration. "The question of the management of tuberculosis in school-children is a subject which at the present time cannot be allowed to lapse. Now, when many members of the School Medical Service are taking up military duties, and when in many parts of the country local practitioners will probably be called upon to render assistance as medical inspectors and advisers, it is most desirable that all such should make themselves acquainted with the clinical and medico-sociological features of the problem. . . . The tuberculosis problem will have to be reconsidered in the light of war needs and war consequences. Already numbers of troops have been invalided on account of tuberculosis. Among Belgian refugees in this country many cases of tuberculosis have arisen. The necessity for extending means and measures whereby tuberculosis may be rationally dealt with at home is manifest to all thoughtful minds, and yet financial and other considerations make extensions difficult, if not impossible. But whatever may be done or left undone, it is of the first and foremost importance that the requirements of tuberculous and tuberculously disposed children should not be overlooked. And in this matter the medical profession can lead public opinion, and can assist in rendering effective service on rational and economic lines."

SLEEPING-PORCHES FOR CITY WORKERS.

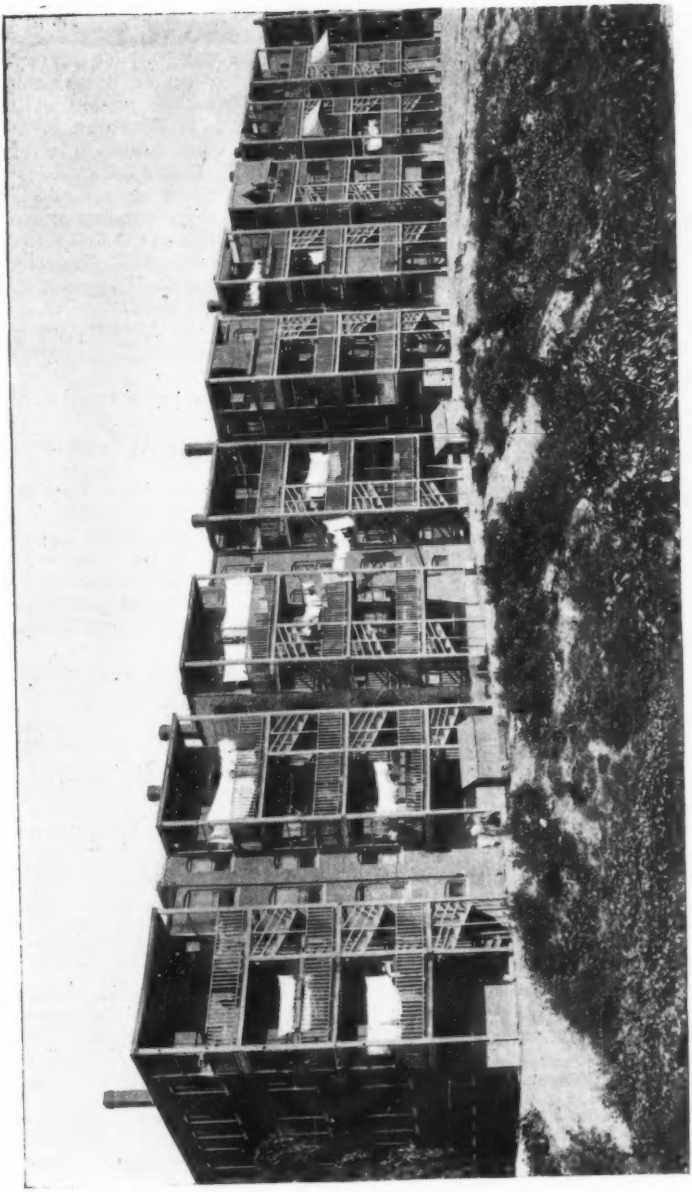
Rational ways and means must be found for the provision of hygienic sleeping-places for tuberculously predisposed and quiescent cases. Economical conduct of domiciliary treatment of consumptive subjects is also essential. The accompanying illustration points its own lesson.[1] It indicates how sleeping-porches are being added to tenement dwellings in Boston, U.S.A. Boston has many of these balconies, and although not beautiful in appearance, they prove of immense service. We believe some such arrangement could be provided with advantage in some of the cities and large towns of this country.

RECORDS OF PROGRESS.

Dr. H. J. Gauvain, the Medical Superintendent of the Lord Mayor Treloar Cripples' Hospital, has prepared an admirable report of the medical work carried on with conspicuous success for tuberculous crippled children at Alton in Hampshire.[2] Non-technical descriptions are given of the methods employed and the results achieved. The aims are thus summarized: (1) To so increase the patient's powers

[1] We are indebted to Mr. Seymour H. Stone, secretary of the Boston Association for the Relief and Control of Tuberculosis, 4, Joy Street, Boston, U.S.A., for the loan of the block from which the illustration has been printed.—EDITOR, *B.J.T.*

[2] Lord Mayor Treloar Cripples' Hospital and College, Alton, Hampshire: First Medical Report by H. J. Gauvain, M.A., B.C. (Cantab.), Medical Superintendent.



SLEEPING-PORCHES FOR TENEMENT DWELLINGS AS IN USE IN THE CITY OF BOSTON.

of resistance that he himself may be made to overcome the disease by which he is attacked, and render it innocuous. (2) To preserve and restore any particular bones or joints diseased. (3) To prevent deformity, or, if deformity already exists, to correct or reduce this deformity as much as is possible. (4) To educate the patient while he is being treated, if his condition permits. (5) To exercise, as far as possible, efficient after-care and guidance, when treatment in the hospital is completed and the patient discharged." There are excellent accounts of various mechanical devices for correcting or preventing deformity, apparatus for artificial heliotherapy, and the conduct of so-called sun treatment. A word of special praise is due to the fine series of illustrations taken from photographs provided by Mrs. H. J. Gauvain.

The article by Dr. Edward G. Glover on "The Early Diagnosis of Pulmonary Tuberculosis" has been issued in booklet form.[1]

Dr. Samuel G. Dixon, Commissioner of the State Department of Health for Pennsylvania, has issued several serviceable bulletins dealing with tuberculosis problems.[2]

Dr. John B. Hawes, 2nd, M.D., has favoured us with reprints of several of his interesting recent articles on tuberculosis subjects.[3]

An account of Anti-Tuberculosis Work in Bombay has just been issued by Drs. John A. Turner and Khan Bahadur N. H. Choksy.[4]

The new report of the British Columbia Anti-Tuberculosis Society gives illustratious of sanatoria and particulars of the progress of its work.[5]

The report of a Conference held by the Boston Association for the Relief and Control of Tuberculosis contains an article by Dr. Cleaveland Floyd on "Tuberculosis in its Relation to the Handling of Food."[6]

The Agricultural Experiment Station of North Dakota has published a well-illustrated and suggestive monograph on Avian Tuberculosis, with a bibliography having 291 references[7]

Foreword by the Right Hon. Lord Moulton, P.C., K.C.B., F.R.S., Chairman of Medical Research Committee. Pp. 60. London: Horace Marshall and Son, Temple House, Temple Avenue, E.C., and 125, Fleet Street, E.C. 1915. Price 1s. net. The London offices of the Hospital and College are at Moorgate House, 61, Moorgate Street, London, E.C. Telephone: London Wall, 1064.

[1] "The Early Diagnosis of Pulmonary Tuberculosis." By Dr. Edward G. Glover. Reprint from the *Quarterly Journal of Medicine*, vol. viii., No. 32, July, 1915.

[2] *Pennsylvania Health Bulletin:* "On the Up-following of Sanatorium Patients" (No. 62); "Effective Rural Sanitation End-Results" (No. 63); "Pennsylvania's System of Tuberculosis Dispensaries" (No. 64). Harrisburg, Pa., U.S.A. 1914.

[3] Articles by Dr. John B. Hawes, 2nd, of Boston, U.S.A.: "A Study of Extra-Pulmonary and Other Sounds which may lead to Errors in the Diagnosis of Pulmonary Tuberculosis"; "Under what Conditions is the Diagnosis of 'Tuberculosis' in Children justified?" "Remarks on the Diagnosis and Treatment of Early Pulmonary Tuberculosis"; "Mesenteric Gland Tuberculosis"; and "Intrathoracic Tuberculosis in Infancy and Childhood, including Bronchial Gland Tuberculosis." Boston, U.S.A.: W. M. Leonard, 101, Tremont Street. 1914.

[4] Annual Report of King George V. Anti-Tuberculosis League, Bombay, for the Year 1914. Published under the authority of the Executive Committee by John A. Turner, M.D., D.P.H., and Khan Bahadur N. H. Choksy, M.D., F.C.P.S., Joint Hon. Secretaries and Treasurers. Printed at Premier Art Printing Works, Fort, Bombay. 1915.

[5] The Eighth Annual Report of the Directors of the Anti-Tuberculosis Society of the Province of British Columbia.

[6] "Communicable Diseases and their Relation to the Handling of Food." Report of a Conference held January 19, 1915, under the auspices of the Boston Association for the Relief and Control of Tuberculosis, 4, Joy Street, Boston, Mass., U.S.A.

[7] North Dakota Agricultural Experiment Station: "Avian Tuberculosis." By L. Van Es and A. F. Schalk. Bulletin No. 108. Pp. 94, with coloured plates.

INDEX

ALCOHOLISM and tuberculosis, 76
AMERICA, heliotherapy in, 70
ANATOMY, morbid, 94
ANTIFORMIN and tuberculous sputa, 195
ANTI-TUBERCULOSIS campaign in Bombay, 51

BANDAGE winder, 159
Barwell, Harold, recent views on laryngeal tuberculosis, 16
BELLEVUE Hospital — Tuberculosis Division, New York, 56
"BILLETING" and tuberculosis, 73
BLOOD-SPECIMENS, collection of, 40
BOMBAY, anti-tuberculosis campaign in, 51
BONES, tuberculous, 35
BOOKS, notices of, 33, 87, 144, 199
BULLOCK, E. S., reflections on tuberculosis and tuberculin, 126

CAMBRIDGE, open-air hospital in, 171
CANADA, anti-tuberculosis movement in, 168
CARE committees, tuberculosis, 164
Carver, A. E., misuse of sanatorium benefit, 77
CASE papers, 42
CHILDHOOD, pulmonary tuberculosis in, 1
CHILDHOOD, tuberculosis of bones and joints in, 35
CHILDREN, defective, 144
CHILDREN, tuberculous, 161, 226
CLOTHING, hygienic, 156
CONSUMPTION, campaign against, 145
CONSUMPTIVES, after-care of, 88
CONSUMPTIVES, employment for, 21
CONTACTS, examination of, 164
COUGH, 5
Cox, William J., discipline and recreation in the sanatorium, 23
CRIPPLES, tuberculous, 147
CUMBERLAND, tuberculosis among school children in, 1

Davies, Morriston, indications for surgical intervention in pulmonary tuberculosis, 12
DAY-CAMPS, 57
DISCIPLINE in sanatoria, 23
DISPENSARIES and general practitioners, 163
DISPENSARIES, tuberculosis, 86, 87, 105, 183
Dixon, Godfrey, B., domiciliary treatment of tuberculous patients, 19
DOMICILIARY treatment, 19, 79, 106, 194
DYSPHAGIA, 18

EAR syringe, 157
EDINBURGH, phthisis death-rate in, 114
EDINBURGH, tuberculosis and housing in, 111
EDUCATION, open-air, 33
Ellis, H. A., sanatorium benefit for tuberculous subjects, 187
EMPLOYMENT for consumptives, 21

FEEDING-CUP, 159
FIRE, protection from, 98
FLIES and disease, 149, 213
FRANCE, heliotherapy in, 67, 88
Fraser, Kenneth, early pulmonary tuberculosis in childhood, 1

GARDENS for children, 65
GLASGOW, phthisis death-rate in, 115
Glover, E. G., subcutaneous tuberculin injections and the diagnosis of pulmonary tuberculosis, 176
GREENOCK, phthisis death-rate in, 116

HEART failure, 93
HEATER, electric, 40
HELIOTHERAPY and surgical tuberculosis, 67, 88
Hinsdale, G., "Surgical" tuberculosis and its treatment by heliotherapy, 67
HOME treatment, 19, 79, 106, 194
HOSPITAL, Bellevue, 56
HOSPITALS, open-air, 171
HOUSING, rural, 89
HOUSING and tuberculosis, 90, 111, 206

INDIA, anti-tuberculosis campaign in, 51
INHALATION, treatment by, 101, 186
INSURANCE committees and sanatorium benefit, 187

IMMOBILIZATION, treatment by, 13
IMMUNITY in tuberculosis, 128
INSTITUTIONS for the tuberculous, 30, 81, 142, 197

JOINTS, tuberculous, 35

KNOWLE open-air school, 81.

LARYNX, tuberculosis of, 16
Leslie, R. M., tuberculosis and the war, 71
LEUKOCYTOSIS, chemotactic, 139
Lister, Thomas D., a note on apparatus and technique for the production of artificial pneumothorax, 25
LOCAL Government Board, Annual Report, 1913-14, 104
LUNG, immobilization of, 13

MANUALS for medical practitioners, 36, 93, 151, 208
MATERIA medica, 90
Matthews, W. J., antiformin and the examination of tuberculous sputa, 195
MIDDLESBROUGH, tuberculosis in, 189
Milestone, W. B., nourishment for the tuberculous, 193
MILKS, condensed and dried, 108
Miller, J. A., and **Drolet, G. J.,** tuberculosis problem in New York, 56
MORTALITY, tuberculosis, 71, 107, 113

NEW YORK, tuberculosis in, 56
NIGHT sweats, 5
NORTHAMPTONSHIRE Sanatorium, Creaton, 197
NOTICES of books, 33, 87, 144, 199
NOTIFICATION of tuberculosis, 104
NOURISHMENT for the tuberculous, 193
NURSES, tuberculosis, 149, 165, 205
NUTRITION of phthisical children, 3

OPEN-AIR education, 33
OPEN-AIR hospitals, 171, 221
OPEN-AIR life, 73
OPEN-AIR School, Knowle, Bristol, 81
OPEN-AIR treatment, physiology of, 166

PEAMOUNT Sanatorium, 30
PHARMACEUTICAL and therapeutical preparations, 44, 101, 159
PHTHISIS in childhood, geographical distribution, 10
PHYSICAL exercises, 73, 203
PLAYGROUNDS, 60
PLEURISY in childhood, 8
PNEUMOTHORAX, artificial, 13, 25, 154
PRACTITIONERS, works for, 36, 90, 151, 208
PREPARATIONS and appliances, 40, 97, 154, 212
PROGRESS, records of, 48, 109, 168, 228
PULMONARY lesions. sites of, 6

RECREATION in sanatoria, 23
REFERENCE, works of, 36, 93, 151, 208
ROMSLEY Hill Sanatorium, near Birmingham, 142

ST. BARTHOLOMEW'S Hospital, tuberculosis dispensary, 86
SANATORIA, equipment for, 99, 154, 212
SANATORIUM benefit, 77, 187
SANATORIUM, discipline and recreation in, 23
SANATORIUM, Northamptonshire, 197
SANATORIUM, Peamount, 30
SANATORIUM, Romsley Hill, near Birmingham, 142
Sandison, A., dispensary treatment without tuberculin, 183
SCHOOL children and pulmonary tuberculosis, 2
SCHOOLS, open-air, 81
SCOTLAND, tuberculosis mortality in, 113
SHELTERS, open-air, 48, 80, 214
Shipley, A. E., open-air hospitals, 171
SLEEPING accommodation for consumptives, 21, 229
SPUTUM bottle, postal, 155
SPUTUM cup holder, 41
SPUTUM destruction, 22
SPUTUM, examination of tuberculous, 195
STETHOSCOPES, 98, 155, 212
SURGICAL treatment of pulmonary tuberculosis, 12
SWITZERLAND, heliotherapy in, 68

THERAPEUTICS, 90
TOXÆMIA, tuberculosis, 134
TREATMENT, domiciliary, 19, 79, 106, 194, 228
TREATMENT by immobilization, 13
TREATMENT by inhalation, 101, 186
TREATMENT, open-air, 166
TREATMENT, tuberculin, 87, 91, 184
TUBERCLE bacillus, reaction of the body to, 130
TUBERCULIN, 148
TUBERCULIN, action of, 136
TUBERCULIN, contra-indications, 181
TUBERCULIN, diagnosis by, 176
TUBERCULIN reaction, 178
TUBERCULIN test, dangers of, 190
TUBERCULIN treatment, 87, 91, 126, 184
TUBERCULOSIS and alcoholism, 76
TUBERCULOSIS of bones and joints, 35
TUBERCULOSIS care committees, 164
TUBERCULOSIS in childhood, pulmonary, 1
TUBERCULOSIS death-rate in Scotland, 113
TUBERCULOSIS Dispensary, St. Bartholomew's Hospital, 86
TUBERCULOSIS dispensaries, 86, 87, 105, 183
TUBERCULOSIS, home treatment of, 19

TUBERCULOSIS and housing, 90, 228
TUBERCULOSIS, immunity in, 128
TUBERCULOSIS, laryngeal, 16
TUBERCULOSIS in Middlesbrough, 189
TUBERCULOSIS mortality, 71, 107, 113
TUBERCULOSIS movement in Wales, 199
TUBERCULOSIS new works on, 33, 87, 144, 199
TUBERCULOSIS in New York, 56
TUBERCULOSIS, notification of, 104
TUBERCULOSIS nurses, 149, 165, 205
TUBERCULOSIS schemes, 146
TUBERCULOSIS, surgical, 67
TUBERCULOSIS, surgical treatment of pulmonary, 12
TUBERCULOSIS toxæmia, 134
TUBERCULOSIS, treatment of, 161
TUBERCULOSIS and tuberculin, 126
TUBERCULOSIS and the war, 71, 220
TUBERCULOSIS zymogen, 129, 133
TUBERCULOUS, institutions for the, 30, 81, 142, 197
TUBERCULOUS, nourishment for the, 193
Turner, J. A., anti-tuberculosis campaign in Bombay, 51

WALES, tuberculosis movement in, 199
WAR and tuberculosis, 71
WEIGHT of phthisical children, 3
Williamson, A. M., housing and tuberculosis, 111

ZYMOGEN, tuberculosis, 129, 133

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CONTENTS.

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	PAGE
Open-Air Hospitals. By A. E. Shipley, M.A., Sc.D., F.R.S.	171
Subcutaneous Tuberculin Injections and the Diagnosis of Pulmonary Tuberculosis. By E. G. Glover, M.B.	176
Dispensary Treatment without Tuberculin. By Alexander Sandison, M.B., B.C., B.A., B.Sc.	183
Sanatorium Benefit for Tuberculous Subjects. By Henry A. Ellis, M.B., B.Ph.	187
Nourishment for the Tuberculous. By W. B. Milestone, A.F.I.	193
Antiformin and the Examination of Tuberculous Sputa. By Walter J. Matthews	195
INSTITUTIONS FOR THE TUBERCULOUS	197
NOTICES OF BOOKS	199
PREPARATIONS AND APPLIANCES	212
NOTES	220
INDEX	231

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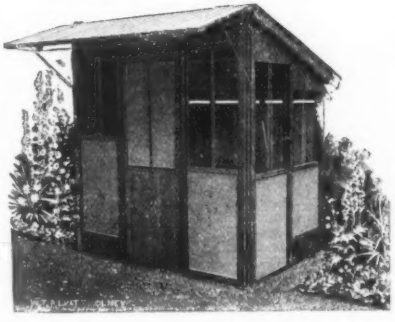

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INDEX

TO ADVERTISEMENTS.

	Pages
Allen & Hanburys, Ltd.	XI
Baillière, Tindall & Cox	IV, VIII, IX, Page III of Wrapper
Bale, Sons & Danielsson, Ltd.	VI, XIV
Beatson, Clark & Co., Ltd.	Page II of Wrapper
Beattie, G. W.	XVII
Benger's Food Ltd.	V
Dartmoor Sanatorium	XIX
Down Bros., Ltd.	X
Hobson, J. T., & Co.	XVII
Horlick's Malted Milk Co.	XIII
Medical Press and Circular	Page III of Wrapper
Nordrach in Wales Sanatorium	XVII
Oppenheimer Laboratories	XIII
Oxo Ltd.	Page IV of Wrapper
Pascall	VIII
Revitt, W. T.	VII
Rogers, Frank A.	XIII
Romeike & Curtice, Ltd.	VI
Vale of Clwyd Sanatorium	XVII
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